

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World.
Founder and Editor: STANLEY SPOONER.

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EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."
(Sir Auckland Geddes, Minister of National Service.)



IN another part of this issue of "FLIGHT" we print an article from one of our contributors, dealing with the effect on the training casualty lists of unnecessary "stunt" flying. We fully appreciate that it is necessary for our aspiring pilots to learn the whole of their business in the air, and to learn it properly. That course of pupillage unquestionably must include a great deal of "stunting," because on the ability of the pilot to so control his machine that he can get out of difficulties and win his way to victory by keeping his Hun opponent guessing will often depend the safe emergence from aerial combat of both pilot and machine. Indeed, the pilot who has not learnt to "stunt" would be easy game to the Hun aviator or "Archie." But there are limits beyond which the game must

Where
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not be allowed to go. Our contributor gives instances of dangerous flying for its own sake, or to gain the applause of people—especially women—altogether outside the Service. We, for our own part, could supplement these examples from others which have come under our own notice. Indeed, anyone who frequents the up-river resorts within 20 miles of London, especially on a fine Sunday, is perfectly familiar with the extraordinary flying risks that are habitually taken out of what appears to be sheer exuberance of spirits.

We agree with our contributor that it is this wonderful sense of vitality among our young flying men that constitutes one of the most priceless assets we possess, but, as we have said, there are limits, and we cannot afford that the toll of accidents should be inordinately swollen simply because the exuberance of youth leads them to take desperate risks without reason or necessity. There must be casualties, because we have to carry through an intensive system of training, during which the perfect war pilot has to be evolved from the raw material in a short course of instruction covering at the most four months. The powers that be of the R.A.F. have taken their account with that as part of the price demanded by the Admiralty of the air. But there is no question that the list is far too large, or that its dimensions are seriously affected by the love of the fledgling pilots for dangerous "stunting." The remedy is easy enough to apply, and it is very clearly indicated by our contributor. We can only trust that the R.A.F. authorities will take the clearly expressed recommendation at its true value and take immediate disciplinary steps to lessen the abuse.

So far we have not touched upon the public danger which is caused by very much of this "stunt" flying. We have no wish to quote chapter and verse of the many examples which have either come directly under our notice or have been reported to us, since the desire to make trouble for the individual is entirely absent. But when a young fool descends so low above a crowded river resort that the wind from his propeller actually takes the hat from a lady's head, as happened on the Upper Thames a week or so ago, we begin to think that it is time attention was called to the matter. The public is prepared to take all the legitimate risks incidental to the war, and to accept them cheerfully, but that sort of thing is most certainly not within the bounds of the legitimate.

A Year's Work of the R.A.F.

The official summary of the work of the R.A.F. during the past year, issued last Saturday, may be bald and unromantic in itself, but it demonstrates a record of achievement which will, we think, surprise even those who have made the doings of the Force their special study. The most cursory glance at the summary will convince the sceptical that the Hun is definitely surpassed in fighting efficiency by the men of our own Air Service. The facts speak for themselves. During the year reviewed by the official statement, no less than 4,102 enemy machines were destroyed or driven down in the various theatres of war, against 1,213 British machines reported missing. Analysing the list, we find that during the year beginning on July 1st, 1917, and ending on June 30th last, 2,150 enemy aircraft have been destroyed by the British on the Western Front alone, while 1,083 have been driven down out of control. In the same period, R.A.F. units working with the Navy have shot down 623 enemy machines. Our own losses in the period were 1,094 machines reported missing, while of the Naval machines 92 are so reported. It will be seen, therefore, that in the West alone British airmen have accounted for 3,856 enemy aircraft, against a total number of missing on our own side of 1,186. On the Italian front, between April and June of this year, the British R.A.F. has destroyed 165 machines and driven down six, at a cost to itself of 13 machines missing. Our airmen with the Salonica force, between January and June, have accounted for 21 machines destroyed and 13 driven down out of control, while of their own machines four are reported as missing. During the period March-June in Egypt and Palestine 26 enemy machines were destroyed and 15 driven down, the British loss being 10 machines missing.

As it stands, it is a wonderful record both in its bearing on the skill of our pilots and the efficiency of our machines. It is, too, a clinching tribute to the supremacy which we have unquestionably established over the enemy's air services, whether German, Austrian or Turkish. It argues that we have better and more skilful pilots—men with better nerve and with more ready grasp of the changing situations that arise in aerial combat—and that the latest fighting machines with which our R.A.F. is equipped are at least as good, and probably better, instruments of war as the best the enemy possesses. All of which is very much to the good. There is a great deal of solid satisfaction to be gained from a perusal of the report, but there is still a word of warning to be sounded that we shall do well to heed. Good as the figures are, we must not allow ourselves to be betrayed into any slackening of effort. On the contrary, we must still strain every resource to turn a strong superiority into an overwhelming supremacy.

The New R.A.F. Uniform.

The new "light blue" uniform of the Royal Air Force is beginning to be seen about in London, and we must say it pleases us. True, it may not be the last word in the design of uniform, but it is truly distinctive of the Service, and that, for the present, is really all that matters. We have always argued in favour of a uniform for the R.A.F. which should be absolutely unmistakable for that of either the Navy or the Army, for reasons which have seemed excellent to ourselves and which now appear to have appealed

with equal force to the authorities of the Hotel Cecil. The main reason we have always had in mind is that if it be desired to create and maintain *esprit de corps* in any Service or unit it is absolutely essential that its members should never be in the position of being mistaken as belonging to something else. We can see that all through the fighting Services, where some prized distinction in dress is more almost than the existence of the unit concerned. The Welsh Fusiliers, for instance, would almost as soon be disbanded as give up the wearing of the "flash," while an Army Council which deprived the Gloucesters of the small plate on the back of the helmet would earn a hatred second only to that with which the men of that famous regiment regard the Hun.

It stands to reason, then, that if the new Royal Air Force is to create that pride of service which means everything to the *morale* of a fighting force it must be clearly and unmistakably a separate body distinguishable from the Army at a glance. That is what the new uniform does—no one who sees the light blue could mistake its wearer for a soldier or a sailor, which is as it should be. Lest there should be some who think we attach too much importance to this matter of distinctive uniform, we may disclose a fact which is common knowledge in the Air Force, and that is that the khaki uniform originally ordered for the Force has created a lot of dissatisfaction among the officers, particularly those who transferred from the R.N.A.S. These latter were very justly proud of their association with the Royal Navy, and the last thing in the world they desired was to become soldiers or to be mistaken for soldiers. It may possibly be a wrong view for them to have taken—we don't think so, but that is another matter—but the feeling is there. And, really, when the matter is probed to the bottom it is not a bad thing, for it denotes that pride in and love of service which spells that high state of *morale* and intense *esprit de corps* which are everything to a fighting service.

To Cross the Atlantic?

It is stated, according to the *Daily Mail*, that there is a possibility of a South American airman attempting to fly the Atlantic this year. That journal takes the opportunity of pointing out that its prize of £10,000 for such a flight has never been won, and reopens its offer. It will be remembered that this prize was suspended on the outbreak of war, but in order to stimulate the production of more powerful engines and more efficient aircraft it has thought well to revive it. Although our first preoccupation is with the war, we still think the *Daily Mail* does well to reopen the dormant prize. A vast amount of progress has been made in aircraft since the beginning of the war, but great as has been the advance, there is still a long way to go before the attainment of the ideal shall have been consummated. True, the preoccupations of which we have spoken may handicap our own constructors in taking part, which is a great pity, but then we cannot have it both ways, and if a South American inventor can evolve a new type or so improve the present that he can win the prize, well, we shall benefit as a nation from his success, and the only people who will suffer will be the individuals who might have been concerned in winning the prize for Britain.

So far as the technical difficulties are concerned, we should not like to say that they are actually already surmounted, but we not only think that the chances of success are immeasurably greater than they were more than five years ago, when no fewer than eleven competitors had announced their intention of trying to win it, but that they all now point to it being done. Engines are far more powerful and reliable, and machines are more efficient than then. All that is missing is the necessary time—and material—to be spared from the work of war to prepare for the effort; in fact, there seems to be more than a probability that the Atlantic flight will be actually achieved before the end of the year. At least, it appears practically certain that it will be attempted under the auspices of the British and American Governments. Major-Gen. Brancker, who is on a special mission to America, is reported by the New York press to have said in an interview in Washington that:—

"An enterprise which must be carried out as soon as possible is the flight of the Atlantic. Once this has been established, America's output of large bombing machines can proceed to Europe by air, and so save the shipping that is so invaluable for other purposes.

"There is no reason why a considerable number of great aeroplanes and seaplanes should not cross the Atlantic during next summer, and the sooner a pioneer proves the flight not only to be possible but comparatively safe, the better."

The Aero Club officials in New York have been enquiring as to probabilities, and find, apparently to their surprise, that aeroplane manufacturers regard the Atlantic flight as almost being a part of the day's work. Indeed, Mr. Workman, the Handley-Page representative, has definitely said, according to the same report, that he will agree to the attempt for a bonus of no more than £500 over and above the contract price of the machine. What Lloyd's think of it may be gathered, it is stated, from the fact that when the Aero Club approached them on the question of insuring a prize of £30,000, the reply was that Lloyd's would not entertain a bet against the flight being made.

There is more than one Richmond in the field. In addition to the above reported offer made by Mr. Workman, Lieut. Belloni is also said to be arranging terms for the flight in a Caproni, while Gen. Brancker has said definitely that there are, at the present moment, three aviators in Washington, not counting himself, who are perfectly willing to make a trial. On the whole, then, it begins to look as though the South American inventor of whom the *Daily Mail* speaks, without he is embraced in the already mentioned possibles, will have to hurry up with his preparations if he really desires to annex the £10,000 offered by that journal for the first successful flight across the Atlantic.

The Recent Strike.

Since we wrote last week on the subject of the strike in London aircraft factories, the affair has been settled by the taking over of the Alliance Works—in which the strike originated—by the Government. If the phrase means what it appears to mean, this is something more than a declaration of the works to be a "controlled establishment," and forms what we conceive to be a very dangerous precedent. This is particularly the case when the whole of the circumstances, as disclosed in the Press, are taken into consideration. With the genesis of the strike everyone

is now familiar, and there is thus no need to repeat the facts which led up to the stoppage of work. We are more concerned at the moment with what happened after the workers "downed tools."

According to a statement issued by the employers, the position when the men ceased work was at once reported to the Ministry of Munitions, which was asked that the dispute might be dealt with under the Munitions Acts. For some days no definite action was taken by the Ministry, but ultimately it was decided to arbitrate, and the arbitrator appointed attended at the works to hear the case. As, however, the men had not returned to work he stated that he could not proceed. The sequence of events appears to have been that the Ministry was notified of the strike on June 27th, with a request for legal advice.

The advice requested was given, and in pursuance of it the firm posted notices announcing that admission to the factory would only be given to those prepared to resume work. After the notices had been posted, on June 28th, the men were still on strike, and a full report of the circumstances leading up to the strike and of the situation as it then stood was ordered to be furnished to the Ministry's local officer.

This report reached the Ministry late the same evening. It stated, among other things, that the Engineering Employers' Federation and the trade union officials were to meet the next morning, provided that work was resumed first. On June 29th work was not resumed, and the meeting was consequently not held. Obviously, there could be no negotiations during the week-end, but it was confidently assumed that work would be resumed on the Monday, July 1st. On that day, however, the men were still out, and a conference was held at the Ministry to consider the situation. At this conference it was concluded that the facts of the strike should be more extensively explored, and it was decided to hold a meeting of the firm and the Engineering Employers' Federation to do so. On July 2nd this meeting took place, and, immediately after, the Ministry telegraphed to the secretary of the London Aircraft Committee to the effect that immediately on the resumption of work the Department was prepared to hold an enquiry into the facts of the case, and whether the man Rock, whose dismissal brought about the strike, should be reinstated. On July 3rd, the secretary of the Aircraft Committee agreed to recommend his men to resume work, but on the following day he had been unable to induce them to return, and arbitration could not, therefore, be proceeded with.

On July 5th the Ministry issued a notification to the Press to the effect that unless work was resumed it, the Ministry, contemplated taking action against those responsible for the stoppage. Thus, in rather more than a week, the Ministry had so far made up its mind that it could at any rate "contemplate" taking action! On the 6th, information reached the Ministry that work would probably be resumed on the following Monday, the 8th, so action was deferred.

On the latter date, however, the men were still on strike, while sympathetic strikes had occurred in many other works in the London area, and it had become clear that the workers involved were not amenable to the authority of their unions. The 8th, 9th, and 10th were spent in almost continuous

conferences, and on the latter date the strike was settled, and the works "taken over" by the Government.

The statement issued by the Ministry is illuminating. After stating the facts that the strikers committed an illegality in leaving their work, and had further thrown over their trade union leaders, the Minister gives the men what amounts to a pat on the back by saying that: "He cannot feel that the management had been either instructed or sympathetic." Reviewing all the circumstances, he "has felt it his duty to invoke his legal powers under the Defence of the Realm Act and the Munitions of War Acts . . . and has directed that the establishment in question be forthwith taken over by the Government."

We do not like the look of the thing at all. We do not propose to enter into any controversy on the merits of the strike. Fortunately that has ended, and there can only be acrimony arising out of any further discussion. What does concern us very deeply is the comparative inaction of the Ministry until a stage had been reached which made drastic action of some sort essential, which state of inaction

was suddenly ended by the appropriation of the Alliance Co.'s business on what seems a flimsy ground at the best. The workers are conceded everything, although they are told they have acted illegally, while the employers, who have at the worst been "un-instructed and unsympathetic," have had their business "jumped." It almost looks as though the Ministry had conspired by its inaction to bring about a state of affairs which would, superficially, justify the policy it ultimately adopted. To the interested observer it certainly looks like the logical consequence of a deliberate policy directed towards getting the whole aircraft industry into the hands of the Government. It is not as though the incident stood alone. We have from time to time drawn attention to the insidious movement that is going on in all directions for the retention of "control" of industry and the nationalisation of commercial enterprise. As we have remarked previously, the incident constitutes a precedent which is fraught with exceeding danger to the future of industrial enterprise, and it is up to those who are interested in the development of industry to combine against the octopus of bureaucratic control.

The King at a Kite Balloon School.

It was announced in the *Court Circular*, on July 16th, that the King, attended by Captain B. Godfrey-Faussett, R.N., and Lieut.-Colonel Clive Wigram, inspected No. 1 Balloon Training Wing, Royal Air Force. His Majesty was received by Lieut.-Colonel John Dunville, Royal Air Force. Major-General Sir Godfrey Paine, Master-General of Personnel, Air Ministry, and Brigadier-General J. G. Hearson, Director of Training, Royal Air Force, were also in attendance.

A Year's Air Work.

THE following report on the fighting in the air during the past year has been officially issued:—

"During the year beginning July 1st, 1917, and ending June 30th, 1918, 2,150 enemy aircraft have been destroyed by the British on the Western Front alone, whilst 1,083 enemy aircraft have been driven down out of control. During the same period, Royal Air Force units working in conjunction with the Royal Navy have shot down 623 enemy aircraft. Of our machines 1,094 have been reported missing, whilst of those working with the Navy 92 have been missing. Thus, in the north, during the year the British alone have accounted for no fewer than 3,856 enemy machines, the number of British machines missing being 1,186.

"Turning to another theatre of war, during the period of April to June of this year, on the Italian Front, the British have destroyed 165 enemy machines and driven down 6 out of control, whilst British machines missing were 13. On the Salonica front between January and June, 21 enemy aircraft were destroyed and 13 driven down out of control, whilst British machines missing were four.

"From March to June in Egypt and Palestine 26 enemy aircraft were destroyed and 15 driven down out of control; 10 British machines being missing. Thus, during the present year, in these outside theatres of war, 246 enemy aircraft have been accounted for, whilst 27 British machines were missing. So that between July, 1917, and July, 1918, the British have brought down very considerably over 4,000 enemy aircraft, whilst British machines missing have only slightly exceeded 1,000.

"Remarkable as has been the progress made in aviation during the war, it must be admitted that we have not yet passed the stage at which all aerial operations are materially affected by weather conditions. In effect, there are from the airman's standpoint two kinds of days—flying days and "dud" days. In the same way the night-flying airman divides each month into "light" and "dark" periods, according to the phases of the moon.

"These facts require to be borne in mind in reviewing any record of aerial operations. One fact emerges clearly from all records of aerial operations, and this is that British superiority and strength in the air in all the theatres of war have progressed rapidly and continuously. From this it should be safe to assume that when the new factor of America's

output, both of aircraft and personnel, begins to enter into the situation, actually in the fighting zones, the aerial ascendancy of the Entente Allies should give them very great advantages.

"In aerial warfare more, perhaps, than in any other branch, there can be no standing still. Having regard to unavoidable war wastage, mere maintenance demands great and unceasing effort. But continuous expansion is what is needed; and that, in conjunction with maintenance, is only possible as the result of uninterrupted co-operation and complete devotion to the end in view, on the part of all the multifarious groups of workers of all grades connected with the war in the air.

Licences for Metal Traders.

THE President of the Board of Trade has appointed Mr. C. A. Russell, K.C., to be an additional member of the committee appointed on February 26th to examine applications for licences under the Non-Ferrous Metal Industry Act, 1918, and to report to the Board of Trade on them.

The President has appointed the following to be a committee to hear applications under Rule 6 of the Non-Ferrous Metal Rules, 1918, made by the Board of Trade under Section 6 of the Non-Ferrous Metal Industry Act, 1918:—

Sir Dudley Stewart-Smith, K.C. (chairman), Mr. C. A. Russell, K.C., Sir Harold Elverston, M.P., Mr. H. J. Mac-kinder, M.P., Sir Ernest Hiley, K.B.E. (Federation of British Industries), and Mr. Edward Manville (Association of Chambers of Commerce).

The secretary to the committee is Mr. C. Roland Woods, Board of Trade, Gwydyr House, Whitehall, London, S.W. 1.

The R.N.A.S. Comforts Fund.

CONSEQUENT upon the merging of the two branches of the Air Service in the Royal Air Force, the R.N.A.S. Comforts Fund, which was organised by Mrs. Murray Sueter in October, 1914, has now combined with the R.F.C. Committee—now known as the R.A.F. Aid Committee—at Surrey House, Marble Arch, W.

During the past three and a half years the R.N.A.S. fund has received £9,598 in donations, as well as great quantities of warm garments, books, &c. Nearly 200,000 articles, such as vests, jerseys, gramophones, cardigans, mufflers, and cigarettes, games, &c., have been distributed to R.N.A.S. ratings at home and abroad. The committee of the fund is now handing over to the joint fund the balance of its cash in hand and its stock, and thanks all who have supported the work.

Although the president, Mrs. Sueter, and Mrs. Henry Balfour (vice-president) are unable to serve on the new committee, they hope that the R.A.F. Aid Committee will receive the generous support which was given to the R.N.A.S. Comforts Fund.

AIR RAID OVER ZEEBRUGGE.

AN OBSERVER'S OWN RECORD.

THE pilot and observer sit in the great bombing machine in silence while on either side the great engines roar.

To the right lies the coast, and stretching inland they can see the star shells and the flash of the gunfire along the lines. They have decided to go by the sea route, and they are slowly forging away from the land as they climb steadily. They pass Nieuport piers well out over the sea, which lies glittering beneath the moon.

The observer watches the coast carefully, and sees near Westende the red and green stars of two signal rockets. It is the German "hostile aircraft" alarm, and over Middelkerke and Ghistelles the searchlights begin to sweep and flicker, and soon the whole coast line, as far ahead of them as they can see, is fringed with the thin tentacles of light.

Soon Ostende lies on their right and they can see the great basin of the docks gleaming like a silver pool in the moonlight. From Ostende again rise the red and green signal rockets, for their progress is being closely followed. They fly on and on parallel to the coast, and at De Haan and Blankenberghe again rise the signal rockets, and the searchlights vainly sweep to and fro over the sea.

They are now nearly off Zeebrugge, though many miles from the coast, and for a few minutes they turn out to sea so as to confuse the Germans. When all the searchlights have been extinguished they turn carefully towards the coast and draw nearer and nearer to their objective. The observer stands up and looks over the pilot's shoulder to find the Mole, which he soon sees, like a curved black sickle, coming from the straight line of the coast.

He points it out to the pilot, and, leaving his seat,

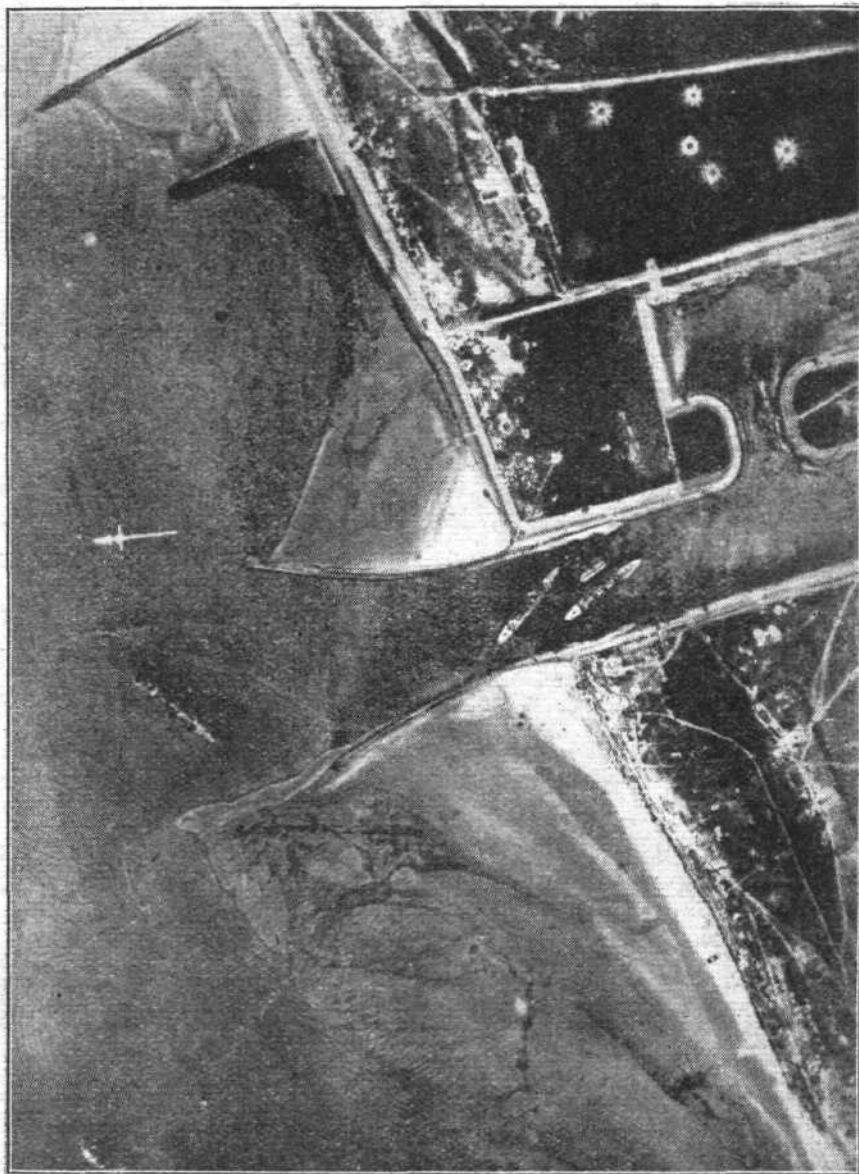
slips into the back of the machine and lies face downwards on the floor. He is now completely enclosed in a framework of wood and steel covered with canvas which flaps slightly with the tremendous rush of air caused by the propellers, whose noise thunders all around him. He removes the safety strap from his bomb handle and slides open a little wooden door below him in the floor. A great burst of air comes beating up on his face. The open door frames a little picture of moonlit sea, across which lies the Mole.

At present no searchlights move across the sky. The approach of the machine is unsuspected. Even as the observer looks down, however, he sees from the shore near the Mole the red and green star clusters of the rockets. At once eight wide searchlights cleave the night, and begin sweeping to and fro, and at the same time the roar of the engines dies as the pilot throttles down.

Now the whole mind of the observer is concentrated on his "bomb-sight" and the Mole. The direction bar already touches a section of the Mole which he wishes to hit. By pressing little buttons set on a plate near him he causes red and green lights to glow in front of the pilot which tell him to steer to the left and right. Slowly and surely the line of the sight

travels across the Mole, and the luminous range bars are drawing near to it. One hand holds the bomb-lever by his side; the other fingers the signal button.

The searchlights are now passing beneath him incessantly, sometimes touching the machine and lighting it for a moment with a dazzling glare. Shells are bursting near him in a fierce barrage, and from the centre of the Mole chains and chains of green balls are rushing upwards towards him. His concentra-



Entrance to Zeebrugge Harbour on June 16th, as photographed from above by the R.A.F. This picture shows very clearly the position of the sunken block ships, and from other photographic records by the R.A.F. taken on May 30th and June 5th respectively, there is apparently no variation in the positions of these obstructions during the seventeen days covered by the photographs. Comment upon the German claims that the harbour mouth had been cleared months ago is needless.

tion is so great, however, that he hardly notices this turmoil of light and fire, while the pilot is too busy watching the signal lights and answering them carefully, to be affected by a hostile demonstration.

Nearer and nearer draw the range bars, and as they cross the Mole the observer presses the lever slowly forward. Behind him he hears the clatter of the falling bombs.

At once now he climbs up to his old position beside the pilot, and tells him that he has finished.

The great wings rise up across the sky as the machine sweeps round and away from the boiling Maelstrom of shells and searchlights and green balls which are now all round it. The observer looks over the side

to the Mole far below, and sees a great red flash in the sea beside it, and then another on the Mole itself, and then another, and the last one in the sea beyond. A pall of white smoke lies across the black curve and above the crash and clamour of the shell can be heard the dull thud of the bursting bombs.

Behind, the Germans vainly sweep every corner of the night skies for the machine, the shells still burst high over the Mole, and the green balls rise in hundreds above the coast, but it is too late. The work has been done, and the machine is roaring home down the sky. The pilot is drinking warm coffee from a Thermos, while the observer writes out his report of a successful air attack on Zeebrugge Mole.

Music in the R.A.F.

It was announced in the *Court Circular* of July 12th that the 1st Royal Air Force Band, under the direction of Capt. Claud Powell, had the honour of playing a selection of music in the forecourt of Buckingham Palace during luncheon.

This was the first public announcement that the R.A.F. possessed a band or was paying any attention to the question at all. As a matter of fact the band, which has been recruited during the past week or two from one of the R.A.F. depôts, is the first of several which it is proposed to start, and forms part of a larger scheme for the organisation of music, both choral and instrumental, in the force which is being developed by Maj. Walford Davies, organist of the Temple Church, who is organising director of music of the R.A.F. An R.A.F. school of music has been formed in London with Capt. Claud Powell as Officer Commanding. Special attention is being given to the formation of glee clubs, and pending the compilation of an R.A.F. song book, books of part songs, &c., have been issued by the Air Ministry.

The bandsmen wear the blue uniform of the R.A.F. with a white lyre embroidered below the bird on the arm. The programme of music played at Buckingham Palace included Sousa's "Liberty Bell" March, Järnefelt's "Praeludium," Handel's "Largo," Mendelssohn's "Spring Song," Schubert's ballet music from *Rosamunde*, Edward German's "Welsh Rhapsody," "Reminiscences of Grieg," arranged by Charles Godfrey, the Introduction to Act III of *The Mastersingers*, and Balfour Gardiner's "Shepherd Fennel's Dance."

Patents in Enemy Countries, &c.

THE Board of Trade issued the following notice on July 16th:—

"Payments to and on behalf of 'enemies' in respect of Patents, Designs, and Trade Marks.

"The Board of Trade hereby give notice that they have revoked the general licences of December 7th, 1915, and September 5th, 1917, under which, subject to certain conditions, the payment was permitted of fees, &c., due in enemy countries in respect of the grant, registration, or renewal of patents, designs, and trade marks, and also the payment in His Majesty's dominions and Allied territory on behalf of enemies of similar fees, &c., in respect of such industrial property. All such payments are consequently prohibited in future."

An R.A.F. Regatta.

THE R.A.F. held a regatta at Hammersmith on Saturday. In the single sculls, the contest for which was from Thornycroft's to the Kensington Rowing Club, Air-Mech. Gibson won easily from Air-Mech. Taylor; Flight-Sergt. Dempsey and Air-Mech. Allewell beat Air-Mech. Taylor and Air-Mech. Bickell and Sergt. Jones and Air-Mech. Gibson in the final of the pair-oared race, the course for which was from Chiswick Eyot to the Kensington Rowing Club. The four-oared race resulted in a win for Air-Mech. Moore, Air-Mech. Taylor, Corpl. Donkin, Sergt. Jones (stroke), and Air-Mech. Hoyle (cox.), who defeated Air-Mech. Lale, Air-Mech. Allewell, Air-Mech. Gibson, Air-Mech. Marshall (stroke), and Corpl. Watts (cox.) in the final.



The First R.A.F. Band, with Capt. Claud Powell as Officer Commanding.—The members have been recruited within the last fortnight from one of the R.A.F. depôts, and the band is but the forerunner of many others.

REPORT ON THE FRIEDRICHSHAFEN BOMBER.

[Issued by the Technical Department (Aircraft Production), Ministry of Munitions.]
(Concluded from page 773.)

Controls.

ONLY one set of control gears is fitted; but, as pointed out, the seating accommodation is so arranged that any of the crew can take charge if, and when, necessary.

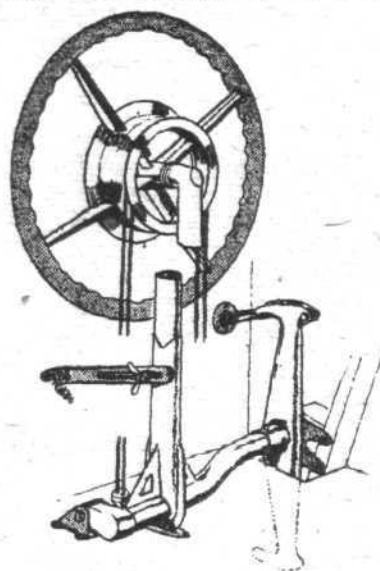


Fig. 42.

It will be observed from Fig. 42 that a locking device whereby the elevator control can be fixed in any desired position is fitted, and consists of a slotted link which can be clamped by a butterfly nut to the control lever. This link

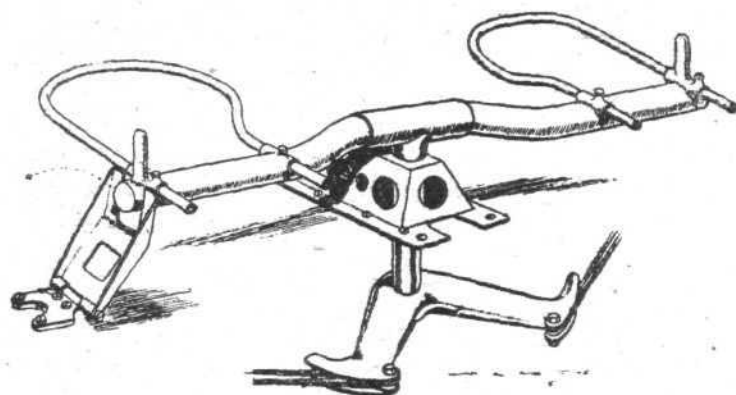


Fig. 43.

is hinged to a small bracket attached to the panel below the pilot's seat.

Fig. 43 shows the rudder control, from which cables are taken over pulleys and through housings in the nacelle and finally to the end of the fuselage. The cranked rudder bar is of light steel tube, and is arranged to be placed in the pivot box in either of two positions. It is furnished with light steel tubular hoops which act as heel rests and are adjustable. A locking clip is fitted on the floor of the cockpit so that the rudder can be fixed in its neutral position.

A novel type of trimming gear is an interesting item of the control. Movement of the elevator control from the normal upright position of the stick is made against the tension of one of two springs which can be alternately extended and relaxed by means of a winch connected to them, as shown in the diagram, Fig. 44. Normally these springs tend to bring the control stick back to a central position, in which the elevator lies flat, but if one of the springs is tensioned by winding up the winch in a clockwise direction, the position to which the stick will tend to come when released will be such as to set the elevator at a positive angle. This winch gear, which is illustrated in Fig. 45, is mounted on the right-hand side of the nacelle, and is therefore under the command of the pilot's companion.

The crank is furnished with a locking pawl, which engages with a ring of small holes bored in the plate of the winch. The steel springs used in conjunction with this apparatus are some 3 ft. long and about $\frac{3}{4}$ in. in diameter. The inscription behind the winch reads:—

Nose heavy—Right wind.
Tail heavy—Left wind.

Landing Gear.

As might be expected, the landing gear on this machine is of massive proportions. Two vertical streamline section wood-filled tubes descend from the centre section wing spars, immediately under the engine, to a bridge piece or hollow girder made of welded steel. This is shown in the photograph Fig. 46. Through an oval hole in this girder a short axle carries two 965 mm. \times 150 mm. wheels (38 ins. \times 6 ins.). These work up and down against the tension of a bundle of steel springs about $\frac{1}{2}$ in. in diameter and made of wire approximately $\frac{1}{8}$ in. thick. The steel girder is extensively pierced for lightness, and the edges of the holes are swaged inwards. The axle is prevented from moving sideways by plates, and is provided with short steel cables which act as radius rods and connect it to the front of the girder. The whole of the box girder is covered in with a detachable bag of fabric, which extends up to the small cross bar mounted immediately above the girder.

Mudguards are provided behind each landing wheel for the purpose of preventing any mud or stones dislodged by the wheels from coming in contact with the propellers.

From the front and rear of the box girder streamline tubes are taken to the ends of the main wing spars, where they abut against the nacelle, and these diagonals are further braced with streamline steel tubes. Both the vertical and diagonal tubes are held in split sockets so as to be easily replaceable if damaged.

In addition to the four main landing wheels, a fifth is mounted under the nose of the fuselage, as shown in the photograph Fig. 47. This wheel is 760 mm. \times 100 mm. (30 ins. \times 4 ins.). It is mounted on a short tubular axle, which is capable of sliding up and down slots in its forks against a strong coil spring, and it is also capable of a certain amount of lateral movement along its axle, also against the action of two small coil springs.

The tail portion of the fuselage is protected by a fixed skid made of wood but shod with a steel sole. This is arranged, as shown in photograph Fig. 48, and is fitted with a small coil spring contained inside the fuselage.

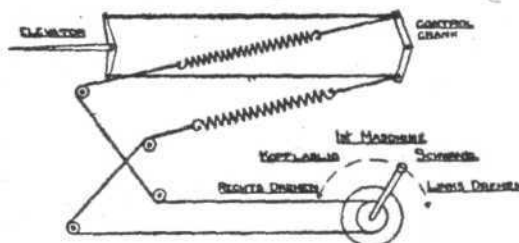


Fig. 44.

Wiring.

The whole of the wiring system on the machine is very neatly carried out. There are three main systems; firstly,

the ignition wiring, which is contained for the most part in tubes of glazed and woven fabric, secondly, the heating system, for which the wires are carried in flexible metal conduits, and thirdly, the lighting system, in which a thin celluloid protective tubing is used. Wires are run from the nacelle along the leading edge of the upper planes to points level with the outermost strut. Here they terminate in a plug fitting placed behind a hinged panel. Apparently lamps are intended to be served by this circuit. Immediately in front of the pilot's seat a universally jointed lamp bracket is mounted on the outside of the nacelle. The exact purpose of this lamp is not known, as it could not illuminate any instruments.

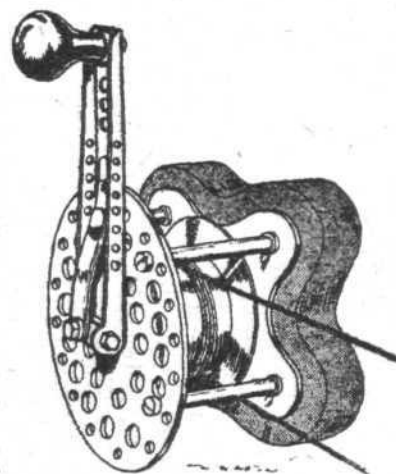


Fig. 45.

Armament.

Both the forward and rear cockpits are furnished with

swivel gun mounts carrying Parabellum machine guns. These mounts consist of built-up laminated wood turntables working on small rollers, and carry a U-shaped tubular arm for elevation. This arm is hinged to a plunger rod working through a cross head, and arranged so that the arm is normally pulled down flat on the turntable by a coil spring. The plunger can be locked in any of a series of positions by means of a bolt operated by a hand-lever through a Bowden wire. A second

rollers by two wire netting screens supported by tubular steel brackets, placed on either side of his cockpit. These are sketched in Fig. 50.

In addition to these two guns, provision is made for mounting a third in front of, and to the right of, the pilot's cockpit, where it could be managed by his companion. For this purpose a clip is provided immediately under the coaming of the nacelle, and the handle of this protrudes through a slot

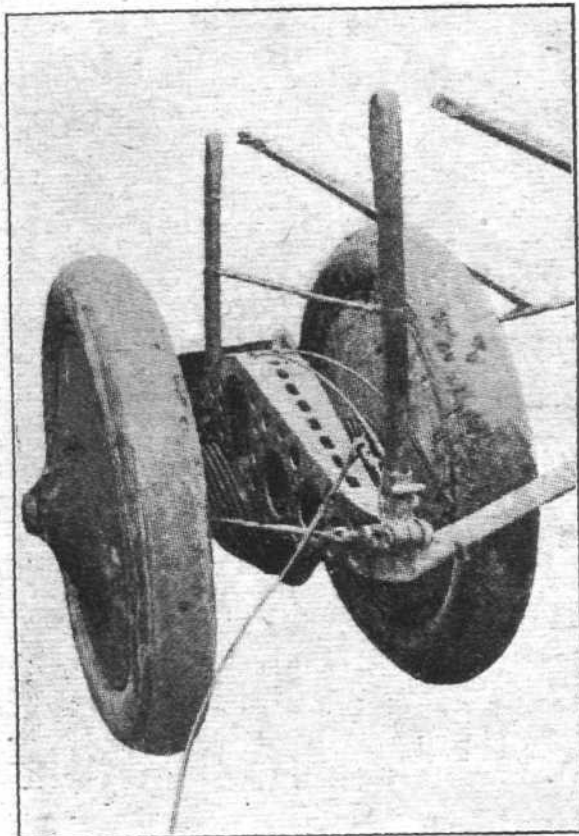


Fig. 46.—Main landing chassis with fabric fairing removed.

lever allows the turntable to be locked at any desired point. A perforated sheet-metal shield protects the cross head and spring. Small shoulder pads are fixed on the turntables, of which that in the forward cockpit has a diameter of 2 ft. 10½ ins., whilst in the rear the diameter is 3 ft. 0½ in.

A photograph of the forward gun mounting is given in Fig. 49.

The after-gunner is prevented from damaging the pro-

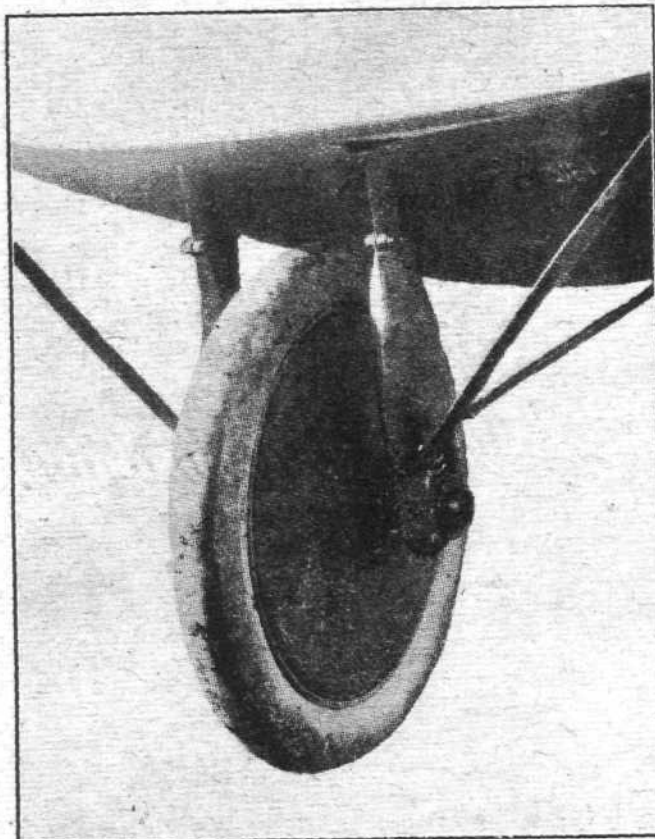


Fig. 47.—Landing wheel under the front portion of the nacelle.

in the dashboard. The clip works on the eccentric principle, and appears to be self-locking. Its construction is shown in detail in Fig. 51.

A rack for Verey lights is mounted on the outside of the nacelle convenient to the pilot's companion.

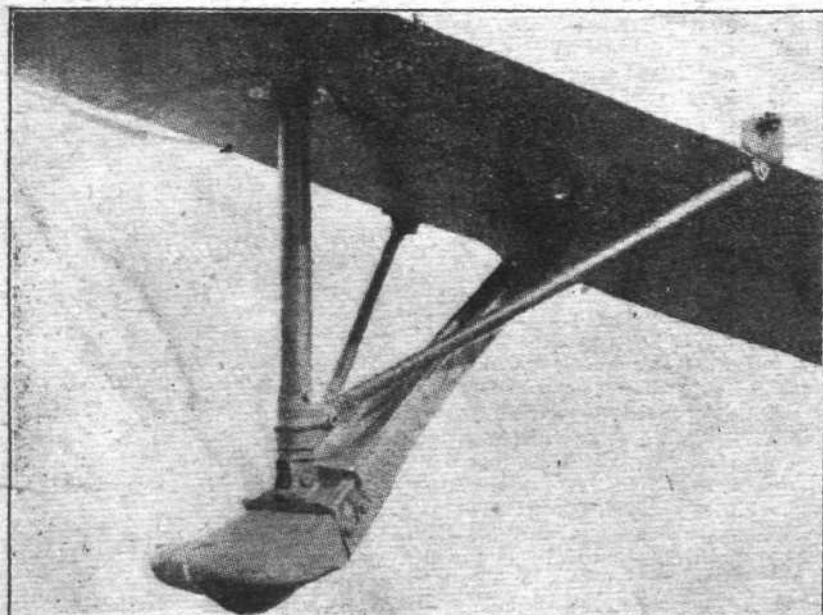


Fig. 48.—Tail skid.

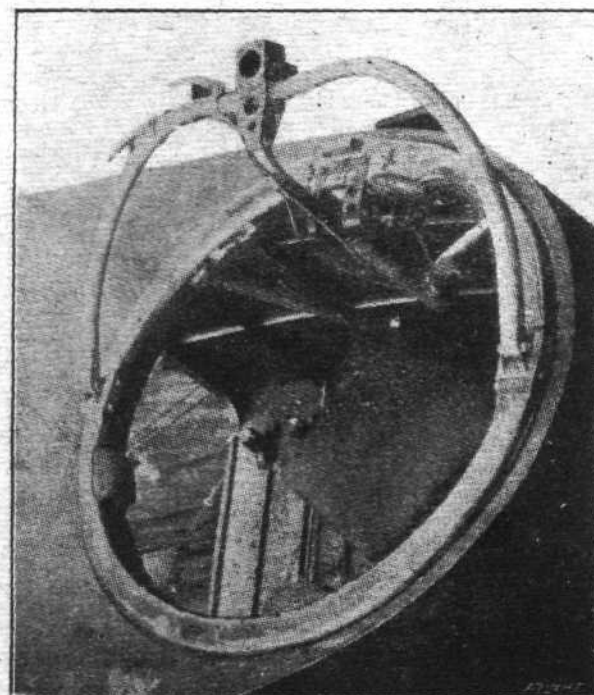


Fig. 49.—Machine gun mounting in the front portion of the nacelle.

Instruments.

Airspeed Indicator.

Considerable interest attaches to the fact that this Friedrichshafen Bomber is the first enemy machine brought down which has been found provided with an airspeed indicator. This is of the static type, embodying a Pitot head of the usual type. The indicator has a dial of large size, and is alto-

gether a much more bulky instrument than any of a similar purpose used on British machines. An investigation of its mechanism is being made.

Altimeter.

This is of the usual type, reading to 8 kilometres.

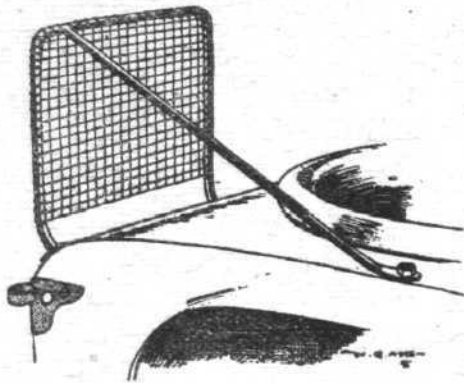


Fig. 50.

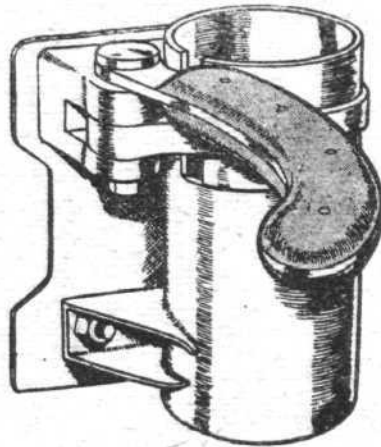


Fig. 51.

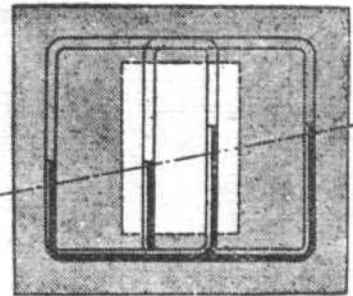


Fig. 52.

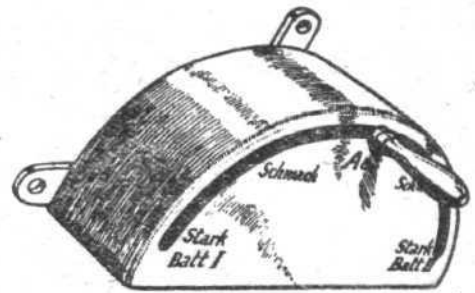


Fig. 53.

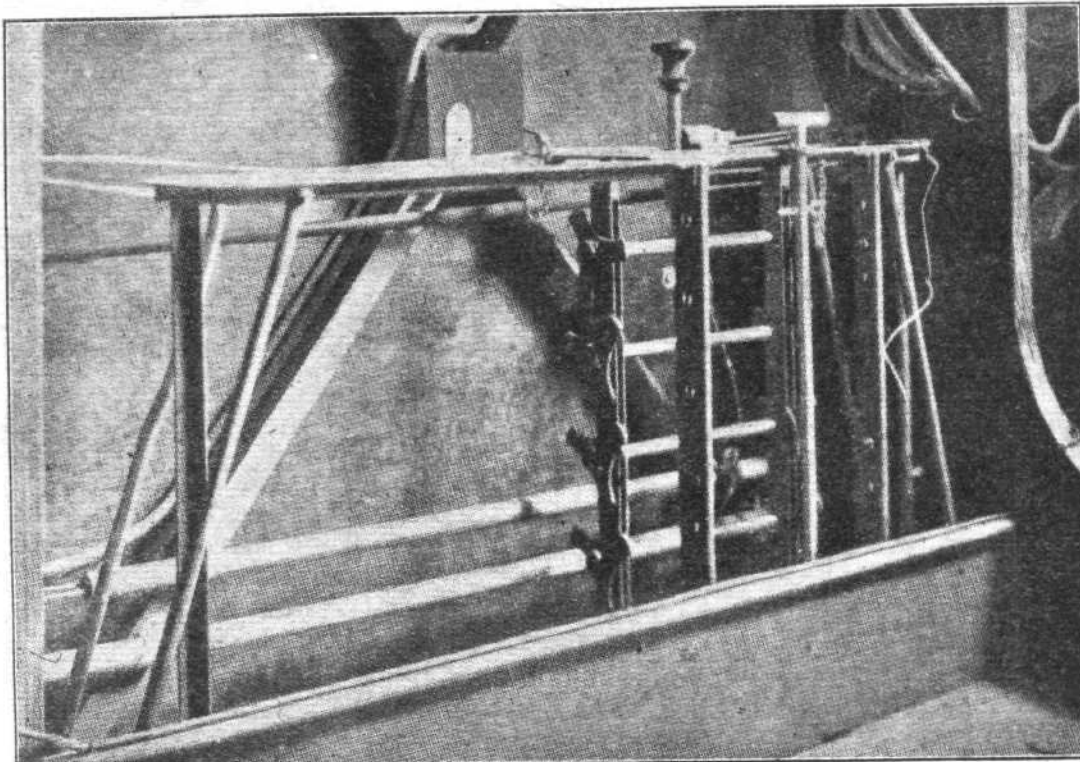


Fig. 54.—View of bomb-rack in nacelle. Behind it can be seen the spring of trimming gear.

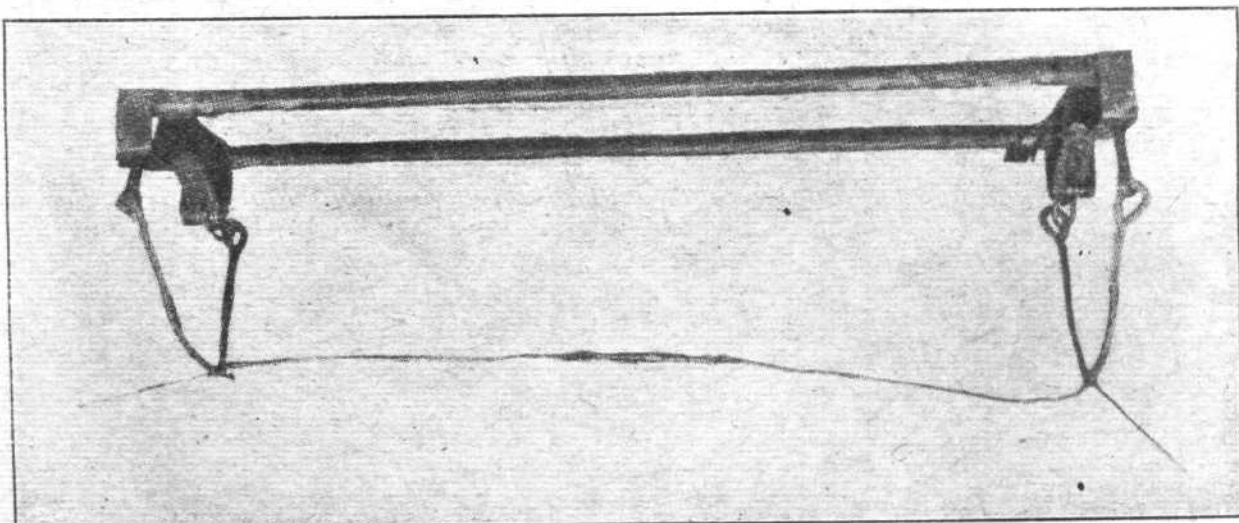


Fig. 55.—Large bomb-carrier.

Level Indicator.

This is a somewhat crudely made device, employing two liquid levels, as indicated in the diagrammatic sketch Fig. 52. It will be seen that the reading gives the pilot an exaggerated idea of the angle of roll. The glass tubes are sealed up, and contain a dark blue liquid. One side of the dial is engraved *Hängt links* (Hangs left), the other *Hängt rechts* (Hangs right). The manufacturer is Arno Weisse, Berlin.

Revolution Counters.

The dials give readings from 300 to 1,600 r.p.m. The sector between 1,300 and 1,500 is painted black, and these figures

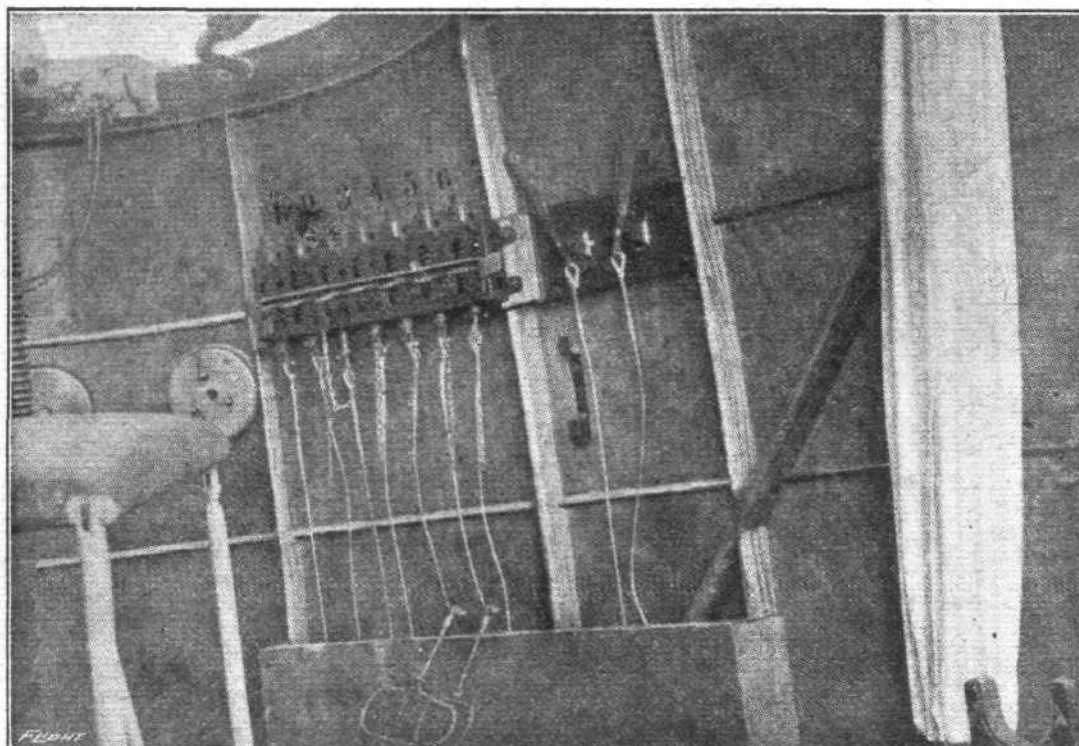


Fig. 56.—Bomb-release gear inside front cockpit.

are marked with luminous compound, as also is the indicating hand. The manufacturer is Wilhelm Morell, Leipzig.

Air Pressure Gauges.

These read from 0 to 0.5 kilogrammes per square centimetre. There is a red mark against the figure 0.25 kg. The manufacturer is Maximall Apparate Fabrik, Berlin.

Electric Thermometer Dial.

This dashboard instrument consists of a box-type meter, the dial reading from 0 to 100° C. The figures 0 and 75 are accentuated by red marks. A switch at the side of the box, having positions marked 1 and 2, allows the temperature of either radiator to be read.

Petrol Level Indicators.

These are of the Maximall type, and employ a float immersed in a tubular guide in the tank. This float communicates its motion to a finger working over a circular dial, by means of a thin cord passing over pulleys. These are encased in pipes which are under the same pressure as the tank.

Electric Heating Rheostat.

This is illustrated in Fig. 53. It is marked *Aus* (off), *Schwach* (weak), *Stark* (strong). There are two separate resistance coils, enabling the rheostat also to perform the function of a change-over switch.

Wireless.

The machine is internally wired for wireless, and the left-hand engine is provided with a pulley and clutch for driving the dynamo. Reference to Fig. 26 will show that this is designed to be mounted on a bracket carried by the outside front engine bearer strut, and that the engine fairing is moulded to receive it.

Bombs and Bomb Gear.

At each side of the covered-in passage-way in the *nacelle* are bomb racks, shown in Fig. 54, capable of holding five 25-pounder (12 kg.) bombs. Underneath the *nacelle* are carried two large tubular frames, fitted with cradles of steel cable and furnished with the usual form of trip gear. These racks, illustrated in Fig. 55, would, it is believed, be capable of supporting a 300 kg. bomb a-piece. The bombs carried,

however, evidently vary with the radius of action over which the aeroplane has to operate. The large racks are not permanently attached to the *nacelle*, but can easily be removed as required.

Fig. 23 shows the inside of the front cockpit from which the release of the bombs is conducted. There are seven triggers for the small bomb racks and two levers for the large bomb trips, as shown in Fig. 56. The cables for this gear are carried under the floor, and are painted different colours for distinction.

Bomb-sight.

The bomb-sight carried on the machine presents no new

features, and is of the ordinary German non-precision type.

Fabric and Dope.

Two entirely different kinds of fabric are employed in the Friedrichshafen machine. The wings are covered with a low-grade linen of the class which is employed on most of the enemy machines. It is white in colour. Compared with that of British fabrics, the tensile strength is fairly good.

This fabric is covered with a cellulose acetate dope, and is camouflaged in large irregular lozenges of dull colours, including blue-black, dark green, and earth colour.

The other fabric, which is applied to the *fuselage*, tail planes, rudder, elevator, fin and landing gear, is apparently a cheap material much inferior to British fabrics designed for a similar purpose. This *fuselage* fabric is dyed in a regular pattern of lozenges, the colours being hardly distinguishable from black. The dope is acetate of cellulose.

In both cases the dope seems to be carelessly applied.

Changes in Design.

When compared with the Fdh. GIII, No. 177/17 (of 13/9/17), brought down by the French, this Friedrichshafen presents a few differences in detail design, amongst which the following points may be noted:—

(1) Engine fairing. In No. 177 spinners were mounted on the propeller bosses, and an aluminium ring of large diameter mounted on the rear extremities of the engine bearers in order to carry the rearmost fairing panels.

(2) Exhaust pipe. In the No. 177 this was, as in the present case, trumpet shaped and turned back at the end, but instead of a series of slots being used, the open vent was "bottled" so that the orifice was slightly restricted, and an additional circle of small holes provided.

(3) Engine bearers. These were of ash in the No. 575, and the L-shaped extension was not used. The method of building up the bearers was, however, similar to that described.

(4) The weight empty was 2,665 kg. in the No. 177, as against 2,695 in the machine under review.

(5) The air-scoops under the engine fairing were smaller.

(6) The arrangement of the instruments, taps, &c., on the dashboard was quite different.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916).

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

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Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F.
Lieut.-Col. C. E. MAUDE, R.A.F.

Secretary:

Lieut.-Com. H. E. PERRIN, R.N.V.R.

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Objects:

The Lords Commissioners of the Admiralty and the Army Council having signified their approval, THE ROYAL AERO CLUB has instituted and is administering this Fund for the benefit of Officers, Non-Commissioned Officers and Men of the Royal Air Forces who are incapacitated on active service, and for the widows and dependants of those who are killed.

Subscriptions.

	£	s.	d.
Total subscriptions received to July 9th, 1918..	12,781	7	10
Staff and Workers of Gwynnes, Ltd. (Sixty-sixth contribution)	8	16	2

Total, July 16th, 1918 12,790 4 0

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

THE ROLL OF HONOUR

(Where an Officer is seconded from the Army, his unit is shown in brackets.)

Published July 9th.

Died of Wounds.

Jackson, Sec. Lieut. H. A. B. Mousley, Sec. Lieut. O. O.

Died.

Prince, Sec. Lieut. W. F. J. MacDonald, Lieut. G. O.
(Lond.). Westcott, Sec. Lieut. W. E.

Wounded.

Drummond, Lieut. J. E. Mundy, Lieut. F. W. (Bucks
Dyson, Sec. Lieut. H. Yeo.).

Missing.

Arnold, Sec. Lieut. J. (King's Nightingale, Lieut. E.
L'pl.). Pontin, Lieut. S. C. M.
Bradley, Lieut. H. B. Roberts, Lieut. T.
Daltrey, Sec. Lieut. F. Stubbs, Lieut. W. H.

Published July 10th.

Killed.

Jenkins, Sec. Lieut. W. W. L. Marshall, Lieut. W. E. I.
Morck, Sec. Lieut. L. S. (A.S.C. (T.)).

Died of Wounds.

Marsh, Sec. Lieut. C. A. (S. McDonald, Lieut. H.
Lancs).

Previously Missing, now reported Killed or Died of Wounds.

Melanson, Lieut. A. J. (Can. For. Corps, att. R.A.F.).

Wounded.

Chick, Capt. J. S. (M.C.). Robertson, Sec. Lieut. A. W.
Cogan, Sec. Lieut. J. A. Snow, Lieut. C. H. (Nova
Creighton, Sec. Lieut. H. H. Scot.).

Missing.

Benson, Sec. Lieut. D. G. Elvin, Sec. Lieut. A. J.
Bryan, Lieut. F. F. H. Jones-Lloyd, Lieut. O. J. F.
Davis, Sec. Lieut. H. C. Muir, Lieut. N. H.
(Essex). Murray, Lieut. K. W. (Brit.
Doe, Lieut. J. E. Col.).
Eaton, Lieut. E. C. (Sask.).

Previously Missing, now reported Prisoners in German hands.

Carter, Maj. A. D., D.S.O. White, Capt. P. R. (E. Ont.).
(New Bruns.).

Published July 12th.

Killed.

Stokes-Rees, Lieut. P. G. Watson, Sec. Lieut. W. E.

Died of Wounds.

Stephens, Sec. Lieut. H. H.

Died.

Von Poellnitz, Maj. H. W. (Linc.).

Wounded.

Anderson, Lieut. P. W. Duff, Lieut. W. W. (Aus.
Chambers, Sec. Lieut. J. A. F.C.).

Missing.

Brand, Lieut. F. R. Forsyth, Capt. W. A. (R.F.A.).
Cabburn, Lieut. F. Goodyear, Sec. Lieut. C. R. F.
Chapin, Lieut. E. A. Sweet, Lieut. G. A.

Published July 13th.

Killed.

Brook, Lieut. A. O'C. (Aus. Dunham, Sec. Lieut. M. L.
F.C.). McDowall, Sec. Lieut. H. S.
Dowling, Sec. Lieut. J. W. Robinson, Sec. Lieut. H. P.

Previously Missing, now reported Killed.

Pender, Capt. W. G., M.C. (R.F.C.).

Died of Wounds.

Haye, Sec. Lieut. R. G.

Died.

Perry, Sec. Lieut. G. D. (Aus. F.C.).

Wounded.

Colley, Sec. Lieut. A. Kerr, Lieut. P. H. (Aus. F.C.).
Davey, Maj. H. B., M.C. (N. Wright, Sec. Lieut. J. E. T.
Staffs). (Leic.).
Franklin, Lieut. W.

Missing.

Boothman, Sec. Lieut. C. D. Welinkar, Lieut. S. K. C.
Browne, Lieut. J. S. McD. Wiggins, Sec. Lieut. T.
Ganter, Lieut. F. S. (Lancs. Fus.).

Published July 16th.

Killed.

Bowick, Lieut. W. R. Goddard, Sec. Lieut. F. E.
Brewer, Sec. Lieut. T. E. Heritage, Sec. Lieut. H. A.
Burch, Lieut. R. S. (Lond. Sco.).
Burns, Lieut. J. R., M.C. Holt, Lieut. C. T.
(Sco. Rif.). Jarvis, Sec. Lieut. E. M.
Coape-Arnold, Lieut. R. de N. Jones, Lieut. M. G., M.C.
(S. Staffs. R.). (North'd Fus.).
Cordiner, Sec. Lieut. G. G. Law, Lieut. J.
Dallas, Maj. R. S., D.S.O., Noad, Sec. Lieut. T.
D.S.C. Scott, Lieut. G. M.
Davies, Sec. Lieut. A. C. Tanner, Sec. Lieut. F. C.
Garlick, Sec. Lieut. T. Tatton, Capt. E. H.

Died of Wounds.

Pither, Capt. S. E. (K.O.S.B.).

Drowned.

Lomax, Sec. Lieut. L. J. Nickells, Sec. Lieut. C. C. G.

Wounded.

Amory, Lieut. W. Raby, Sec. Lieut. T. D.
Bain, Lieut. A. M. Risk, Sec. Lieut. J. B.
Bayly, Sec. Lieut. C. J. Rivett-Carnac, Lieut. W. J.
Byron, Lt. J. F. (Lancs Fus.). Ryles, Sec. Lieut. A. N.
Dalton, Capt. A. H. (3rd Hrs.). Scully, Sec. Lieut. N. R.
Foster, Prob. Flight-Officer Stewart, Sec. Lieut. P. C.
H. E. Storrey, Capt. A. (A.S.C.).
Hartley, Capt. A. E. Storrey, Lieut. J. E.
Holleran, Lieut. O. C. (R. War. R.).
Johnson, Sec. Lieut. J. M. Tremayne-Pearse, Sec. Lieut.
Lewis, Sec. Lieut. C. J. W. B. (R.W. Kent R.).
Parmelee, Sec. Lieut. C. G. Williams, Sec. Lieut. A.
Pearson, Sec. Lieut. G. A. (Arg. and S. Hs.).

Previously Missing, now reported Wounded and Prisoners.

Barnard, Sec. Lieut. R. A. Lane, Sec. Lieut. L. C.
(Lond. R., T.F.). Lewis, Sec. Lieut. D. G.

Previously Missing, now reported believed Wounded and Prisoners.

Hampton, Lieut. P. R.
Hunter, Lieut. H. C.

Robinson, Sec. Lieut. B. W.

Previously Missing, now reported Prisoner.

Dawes, Sec. Lieut. A. F.

Previously Missing, now reported believed Prisoners.

Forder, Lieut. E. G.

Patrick, Lieut. W. D.



ACCIDENTS WHICH SHOULD NOT HAPPEN.

By DOUGLAS W. THORBURN.

I FEAR my very occasional lapses into print are earning for me a reputation for frivolity which I do not always deserve. It may be as well, therefore, to state at the outset that on this occasion I wish to be serious. What I propose to write is done from a sense of duty, the subject being one which I believe requires attention. It arises partly from certain episodes I have seen during the past few weeks, and partly out of a resolution recently passed by the Parliamentary Air Committee—and Heaven forbid I should make fun of any decision of any Parliamentary Committee, though it has been done!

The resolution stated that the Committee desired to reiterate their grave anxiety at the heavy loss of life in training pilots in this country, and the inadequate medical service, and wished to know whether the Secretary of State would confer with them on the subject.

There will always be an aviators' casualty list. The training of enormous quantities of pilots must inevitably reveal a certain proportion of young men who are not really adapted for flying, although experience in selection and the increased expert knowledge of the medical profession are steadily reducing this risk. The testing of new machines and the experimental flying which is so vital to the evolution of aircraft must also entail certain risks, though these are rapidly diminishing. And, of course, flying on active service, thanks to the antagonistic views of the enemy, has its dangers, like any other branch of warfare.

It seems to me, however, that there remain far too many accidents which ought never to have occurred, and in times like these it is of the most urgent importance that everything possible should be done to lessen the casualties, both to men and machines. It is time fresh attention should be drawn to the fact and a strenuous endeavour made to improve the present state of things. Apart from the heavy expense to the country, there are the consequences of a shortage, even temporary, of machines, and perhaps equally important is the effect these accidents have on the nerves and moral of new and potential pilots.

The exuberance and over-confidence of youth is, I believe, one of the chief causes of flying accidents. It is the healthy vigour of the young sportsman, fresh may be from a public school, which goes to make the dashing and fearless aviator, ready for a scrap with half a dozen Huns somewhere above the clouds, ready to carry a cargo of bombs a hundred miles into well-defended enemy territory, or ready to scatter with his machine gun troops in the trenches or on the march. But this same abundance of vitality too often tempts him to indulge in aerial acrobatics for the pure fun of doing it.

To be able to loop, roll, spin, and do all those tricks which so short a time ago were thrilling and yet scarcely arouse the interest of the *blasé* juveniles of to-day, has become a necessary part of the training of a fighting pilot. That is no reason, however, why these performances should be constantly indulged in without cause and in unsuitable places, but everyone who is personally familiar with air stations knows this to be a custom.

A fortnight ago I saw a brilliant and sensational exhibition at an aerodrome in the Home Counties, given purely as an exhibition. The pilot relied on his engine, which fortunately was in a good mood that day. When it was over I asked the Commanding Officer if the pilot often did that kind of thing, and if so, how long he was expected to last. I was told he was always "stunting," and loved it, but . . . a shrug of the shoulders gave the remark a significant ending. The next day that officer started one of his best tricks a few feet off the ground. The engine failed, and he was killed.

Here was a valuable aeroplane entirely destroyed. Worse than that was the loss of a skilled and experienced pilot, whose training had cost the country many hundreds of pounds, and whose life and ability could never be replaced. In addition is the effect his death must have on other pilots of less ability, who cannot help wondering to themselves what chances have they of a lengthy career when one so experienced comes to grief. How is an accident of that kind to be prevented? My opinion, for what it is worth, is that a very important point in the training of an aviator is not fully appreciated and requires further emphasis.

Every pupil should be taught—and never allowed to forget—that the machine he flies is the property of the nation. He should be made to understand its value, not merely in pounds, shillings and pence, but in materials and labour. It should be impressed upon him that his duty is to take the greatest possible care of that machine, and—more important still—of himself.

This may seem absurdly unnecessary to some readers, who imagine that every aviator takes as much care of himself as he would, say, of his meat card. But there are others. There is an aerodrome brand of carelessness which passes for bravery, but is more akin to foolishness, to put it mildly.

It may be remembered that when Chanteloupe, encouraged perhaps by the suggestion of his own name, performed the first aerial loop, he was promptly punished by the authorities with 15 days' imprisonment for needlessly endangering Government property, *i.e.*, the aeroplane on which he flew. It may have been hard lines for so plucky a pioneer, but it was correct discipline, for the experiment was then a dangerous one. To-day this rigid discipline seems conspicuous by its absence, though the need was never greater.

I remember not so long ago when flying over London was forbidden except under special circumstances, but now one sees machines over the West End or over thickly populated suburbs almost daily, and often they are at so low an altitude that engine failure might mean a serious disaster. It is unnecessary to say that such accidents have actually occurred, and yet more flying over the metropolis takes place than ever before.

I should be the last to deny the fascinations of joy-riding over London on a clear day, when one has endless entertainment in identifying well-known thoroughfares and public buildings, and selecting the spots on which, if one were a Hun, one would like to deposit large fat bombs, and possibly other spots on which one could almost do similar damage without changing one's nationality, for I have been across myself many a time—though, I hasten to add, always at a good height. I would strongly urge the need for stringent regulations against crossing London, or any other city or town, at less than a fixed minimum height, which might be varied according to the suitability of the district for emergency landings. (An exception might be made in favour of enemy aircraft, which we can hit better low down.)

It is to be feared that in a large majority of cases of unnecessary "stunting" over towns the reason is not difficult to seek. "*Cherchez la femme*." I could give numerous instances. There are three seaside resorts on the South Coast where officers from local aerodromes frequently fly up and down the beach at 100 ft. or so, playing leap-frog over piers and diving playfully at people on the sands, obviously for the benefit of admiring lady friends, with whom, an hour or two later, they are to be seen walking along the front, still in flying kit. I have seen it done. There is an officer at another training centre whose special delight it is to fly around the home of his *fiancée* and endeavour to drop notes and things into her garden. One day recently he dived at the garden six times before he got close enough to be certain of his aim. The probability is he will one day hit the house if he is not taken in hand severely by his C.O. in time.

If the authorities make enquiries of the residents in the neighbourhood of almost any air station near London or any other important centre of population they will find ample evidence that this kind of thing is far too prevalent. The number of fatalities occurring during training is becoming serious, as the Parliamentary Air Committee stated, and one method of combating this is a higher standard of discipline. It can be done, and I have no doubt is being done at many stations, without in the least crushing the marvellous spirits of our would-be aviators, in whom we have the finest material in the world.

At the same time, any pilot who recklessly endangers his own life or the safety of his machine should be made to understand by appropriate disciplinary methods that he is failing in his duty, and hindering instead of helping in the task of crushing his country's enemies. In other words, he is delaying the end of this appalling war.

"A MODERN BAYARD."

OUR distinguished and vivacious colleague, M. Jacques Mortane, is publishing an interesting series of articles on the great French "ace," Guynemer, in his paper, *La Guerre Aérienne*. M. Mortane is always interesting when he writes of those whom he terms "the winged workmen of victory," as he combines a truly Gallic verve with an ant-like industry in the pursuit of fact. We know of no aeronautical writer who can be informative so gracefully, and so entertainingly.

In the career of the famous fighting pilot, who died—as he had lived—a modern Bayard "sans peur et sans reproche," he has full opportunity for the lambent wit that makes him so eminently readable. Subordinating his own vivid personality, he speaks through his hero, but we know to whom we are indebted for many a felicitous word and phrase in these descriptions of "this work of aerial salubrity" (a phrase reminiscent of Wells's description of the war—"a filthy piece of sanitation, that we have got to do").

The Ancient Mariner, with his glittering eye, could not do better. Listen:

"The day before, in a few minutes only I had had the luck to send elegantly to the ground a Fokker that I will not count, because it was so far away in the enemy lines. Next day, the 23rd September, I lit out about dinner time. I have a particularly affectionate regard for this hour, for the Boche cherishes a delusion that at this time we eat, and sip our coffee, profiting by this opportunity to inflict his odious self upon us.

"I was not long in seeking fortune. A Boche appears before me, and hardly accepts the combat. Poor type! At 11.23, after two cartridges only, he descended, exploded, pulverised, burnt, inside our lines, 300 metres from Roye. 'Oeuf à la coque Guynemer: Put an egg in boiling water when your ace accepts combat, wait till he has killed his Boche, withdraw your egg, it will be done to a turn! What a triumph for the restaurant menus!'

"If you wish, I will guarantee you that the three minutes are absolutely chronometric! But list, and I will tell you how I was nearly dished myself. Looking out over the immensity of the azure that I had just cleansed, in the hope that other amateurs might present themselves (before Heaven! we do not exaggerate, our poor prose is hobbling after M. Mortane's elegant and varied French, to his great loss—the polychromatic colours that his gay Gascon uses are not to be found on our sober palette!)—'of other amateurs' then—'when suddenly, thirty seconds after, a shell from a French 75 lashes through one of my wings. My *avion* seems wounded as to death, the left wing utterly ripped. The linen snaps in the wind, tearing more as the fall prolongs. My machine falls, founders, rolls in the abyss, incapable of supporting me! Truly I hear the call of Death, toward whom I seem to hasten vertiginously. Nothing, it seems, can hinder my being crushed on the earth. A frightful *vrille* commences at 3,000 metres, and continues until 1,600, and I feel lost, I demand only of Providence not to let me fall in enemy territory. *Ca, jamais*; They would have been too pleased. Do you see me, interred with my victim. But I could not assert my will, the machine obeyed not. At 1,600 still I struggle, the wind having thrust me as far as our lines. I

am already half happy. I think now of an interment with the sympathetic comrades following my remnants!

"At least no pointed helmets shall defile me! (I feel none the less that it is death, and not agreeable.) The fall continues. The controls do not answer. Twist to right, to left, push, pull, no result, the meteorite will not arrest itself. Invincibly I am drawn to the soil where I shall lie crushed!

"Here it is! A last gesture, brutal, but in vain. I shut my eyes, I see the earth—which, at 180 kilometres an hour, rushes to annihilate me! A rending crash, a strong commotion, of my Spad there remains nothing. How am I still living? It is my safety belt that has saved me, incrusting in my shoulders, without it I should be dead at this hour, *moi qui vous parle*!"

Not the least vivid of this series is the one entitled "The Avenging Storks." The description of the little town awaiting the advent of the signalled German raiders is really quite fine:—

"The light of the sun seemed less bright to us, and its rays grown cold. An inexplicable *malaise* weighed on man and beast alike. The leaves of the trees ceased rustling. All was still, deeper and ever deeper grew the depression. In the great parks, the red and white cattle look uneasily at the horizon!

"The town is submerged in sadness, and from the delicate belfries, like lace-work in stone, yet standing upright in supreme defiance, comes a monotonous peal, sinister, saying harshly, 'Good folk, look to yourselves, danger is toward!'

"Soon, in effect, on the far-away horizon, on the level of the darkening clouds, appear little black points, swimming into sight with a menacing rapidity. As they come the ear detects a sullen drumming, full of hate. A lugubrious cry passes over the town—'It is they, the birds of prey!' Like leisurely vultures, they bring death, and around them swing the rapid hawks with pointed wings, their steely beaks bared for the fight. But suddenly one cries—'Les Cigognes—les Cigognes!'

"Behold them, then, who advance rapidly from the west! The nightmare is finished. These glorious birds will triumph over the rapacious ones. They pounce on the shivering cavaliers of the Apocalypse hardly, and scatter them abroad as broken things. The evil dream is ended!"

As we know, Guynemer was one of the most famous fighters of this redoubtable force. After a career of amazing brilliance he was at length brought down. It is some consolation to hear that "Lieutenant Wisseman, who had committed the sacrilege of bringing down this divinity of space, only survived his success for a few days." He was in turn shot by the redoubtable sous-lieutenant Fonck, now the leading French ace.

The end of this plucky lad is a little plaque in the Panthéon at Paris, in company with many another noble name: "This inscription is destined to perpetuate the memory of the Captain Guynemer, a symbol of the aspirations and enthusiasms of the Nation." But if the body lies still, with the alert mind that informed it, the heritage lives indeed.

R.H.B.



"Telegraphy, Aeronautics, and War."

AMONG those experts who have without fee or reward, given freely of their time and experience with the object of assisting towards the winning of the war must be included Mr. Charles Bright, F.R.S.E. As far as aeronautics is concerned, he is best known for his conscientious work as a member of the R.F.C. enquiry committee, and in his latest book, which has the above title, he has reprinted the recommendations he made in connection with that enquiry, many of which have been since carried out. In a way it is a pity that Mr. Bright has put all his eggs in one basket, for the greater part of the book is taken up with papers and memoranda on various questions relating to telegraphy—a subject which he has made his own. The result is that his work in connection with aeronautics is overshadowed. In the somewhat lengthy introduction, however, Mr. Bright makes many trenchant and pertinent criticisms of the professional politician and his ways as revealed by the war, and he also pleads for a wider conception on the part of the professional war makers with regard to the use of aircraft. "Distinguished generals," he says, "who have been brought up in land warfare naturally tend to stick to it; but if those in supreme command had from the first more clearly realised

the full potentialities of air warfare, the contest would probably have advanced in our favour far more rapidly than it has. War in the air is not only much quicker than over land, but far cheaper." The book is published by Messrs. Constable and Co. at 16s. net.

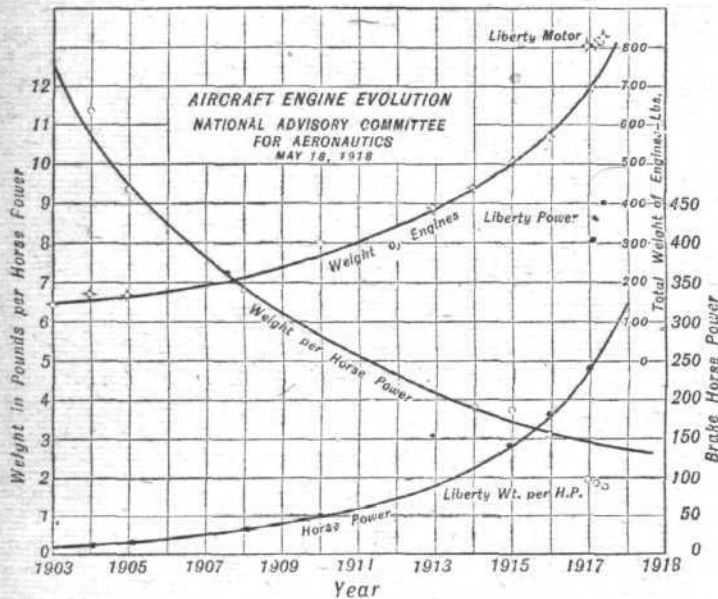
A Norwegian Air Route Company.

THE Norwegian Air Route Company was constituted officially on July 11th at a meeting with M. Mowinkel, President of the Storting, in the chair," says the *Times* correspondent at Christiania. "The share capital was fixed roughly at £183,000 (at pre-war rates), and the objects were defined as follows:—'To carry on regular routes by means of airships, mails, goods and passengers.' Other air traffic will be considered. The powers of the company are vested in a corporation consisting of men representative of the whole country, of the business community, of politics, and of science. Dr. Nansen was elected president. The board of management will consist of five members, including the managing director, and the technical director, M. W. Keilhau, to whose initiative the company owes its foundation, was appointed managing director, and Captain Gyth Dehli technical director.

EVOLUTION OF THE AEROPLANE ENGINE.

THE U.S. War Department has authorised the following statement on the evolution of the aeroplane engine which has been prepared by the National Advisory Committee for Aeronautics:—

The first man-carrying flights were made in December, 1903, with the Wright Brothers' engine developing 12 h.p. and weighing 152 lbs., or 12.7 lbs. per horsepower. In 1910,



seven years later, the average horsepower of aeronautic engines had increased to 54 and the weight decreased to 5.7 lbs. per horsepower. In another seven years, 1917, the average power output had advanced to 243 h.p. and the weight decreased to 2.8 lbs. per horsepower. In March, 1918, the Liberty twelve developed 432 h.p. for a weight of 808 lbs., or 1.86 lb. per horsepower. At the present time, May, 1918, the Liberty twelve is yielding a maximum of 450 h.p. for a weight of 825 lbs., or 1.83 lb. per horsepower.

The accompanying table and curve sheet show the advance in the average power-weight ratio by years for the engines in actual flying use. It is to be especially noted that the Langley-Manly engine, built in 1901, was nine years

ahead of its time in the matter of power output and sixteen years ahead in its weight per horsepower.

In 1917, the Liberty "twelve" was 65 per cent. more powerful and 28 per cent. lighter per horsepower than the average in service for that year. So far this year, these figures are probably changed to 50 per cent. and 25 per cent. respectively, which indicate the advance of the Liberty over the average engine in service at the present time.

Aircraft Engine Evolution.

Name of Engine.	Year.	Horse power.	Weight (lbs.)	Weight per h.p.
Langley-Manly Engine ..	1901	52	151	2.9
Original Wright Bros. ..	1903	12	152	12.7
Improved Wright Bros. ..	1904	16	180	11.4
Improved Wright Bros. ..	1905	19	180	9.5
Redesigned Wright Bros. ..	1908	35	182	5.5
Average on market ..	1910	54	309	5.7
Wolseley Engine ..	1913	147	720	4.9
Average on Market ..	1914	112	437	3.9
Average on Market ..	1915	133	512	3.8
Average on Market ..	1916	185	570	3.1
Average on Market ..	1917	243	693	2.8
Liberty 12 cyl. ..	1917	400	801	2.0
Liberty 12 cyl. (March ..	1918	432	808	1.9
Liberty 12 cyl. (May) ..	1918	450	825	1.8

The average consumption of fuel decreased from about .8 lb. per horsepower in 1903 to about .65 in 1914, since which it has slowly dropped to .55 lb. in 1918, and for the Liberty to .50 lb. The present Liberty consumption is approximately .46 lb. per horsepower hour.

Illustrating the advance made, the Wolseley Company in 1913 could only obtain 147 h.p. at 1,400 revolutions per minute from eight cylinders, 5-in. bore by 7-in. stroke, or 18.375 h.p. per cylinder. This is the same size cylinder as used in the Liberty, which now gives 450 h.p., at 1,800 revolutions, from twelve cylinders, or 37.5 h.p. per cylinder obtained in the Wolseley. Even if we reduce the Liberty results to the same speed as the Wolseley, that is, 1,400 revolutions, the Liberty still represents a great advance, for at that speed 350 h.p. are developed, or 29.2 h.p. per cylinder. Moreover, the Wolseley weighed 4.9 lbs. per h.p. as compared with 2.3 lbs. for the Liberty at the same speed, or 1,400 r.p.m.

[In connection with the above table it will be interesting, at the conclusion of the war, to have particulars of the engines upon which the averages for 1913 to 1917 were based.—EDITOR.]

To Improve Japanese Air Service.

EFFORTS are now being made to speed up the organisation of a really powerful air service in Japan. At Tokyo on July 9th, the Prime Minister was the guest at a luncheon given by Baron Sakatani and General Nagaoka, Vice-Presidents of the Imperial and National Aviation Societies, to inaugurate the formation of a combined national association to secure the aid of bankers and men of affairs in an effort to raise aviation in Japan to the level of other countries.

The Bombardments of Paris.

In a summary of the results of the bombardment of Paris the *Temps* states that it was on January 30th this year that aerial bombardments were begun in earnest, and on March 23rd when the long-range guns began. The first German raid of importance was that of the night of January 30th-31st, in which 55 persons were killed and 203 were injured. Up to June 30th, 20 Gotha raids were reported, and on five occasions the alarm was sounded, but no raid followed. There were 39 days of bombardment by long-range artillery.

The casualties furnished by official *communiqués* total for the period from January 1st to June 30th 141 killed and 432 injured. These figures do not include victims who subsequently died from their injuries, nor 66 persons who were suffocated on March 11th in a crowd as the result of panic at the entrance to a Metropolitan refuge.

Bombing Germany in June.

THE following was officially issued on June 11th:—

"During the month of June no fewer than 74 raids were carried out by the Independent Force, Royal Air Force, over Germany. In all 61½ tons of bombs were dropped during these raids.

"It is worthy of note that the British raids over Germany show a continuous increase in number and in weight of bombs dropped upon important military objectives. The previous best month was May last, when 48½ tons of bombs were dropped by the Independent Force.

"The following is a list showing the towns raided, the

precise military objectives upon which the bombs were discharged, and the number of separate occasions on which each place was raided. This list covers only work of the R.A.F. Independent Force over Germany, apart altogether from the immense weight of bombs dropped by Royal Air Force airmen throughout the Western front, and upon such coastal objectives as Ostend, Zeebrugge, Bruges, &c., or the formidable work of the French Air Service:—

Place.	Military objective.	No. of times raided.
Ars-sur-Moselle (south-west of Metz)	Station	1
Boulay (Bolchen)	Aerodrome	6
Coblentz	Factories, station, barracks	1
Dillingen	Factories, station	4
Frescaty	Aerodrome	2
Hagenau	Aerodrome	2
Hagendingen	Factories, station, siding	3
Karlsruhe	Railway establishment, explosive factories	4
Karthaus	Station, railways	3
Landau	Barracks and aerodrome	2
Luxemburg	Railway sidings	1
Mannheim	Chemical Factory	4
Metz-Sablon	Station, railway triangle, sidings	18
Offenburg	Engine sheds and barracks	1
Rémilly	Railway junction	1
Saarbrücken	Factories, sidings, station workshops	5
Thionville (Diedenhofen)	Station, sidings, railway workshops	12
Trèves	Station, railways	2
Wadgassen north-west of Saarbrücken	Blast furnaces	1
Zweibrücken	Station and railway workshops	1

SOME OUTSTANDING PROBLEMS IN AERONAUTICS.

By Dr. DURAND.

(Concluded from page 782.)

Airscrew with Adjustable Pitch.

IN addition to these problems which relate to aeroplane propulsion in its general aspects, and more especially when for the sake of simplicity we assume that the aeroplane remains under a uniform regimen as regards external conditions, there arises a problem of very great present importance, that of some form of adjustment in the technical characteristics of the plane as a whole permitting it to be made responsive to variations in the regimen of operation, as for example, change in the density of the air due to change in altitude, or change of regimen required for climbing flight as compared with horizontal flight.

In connection with the prime mover, mention was made of the very important problem of maintaining power at altitude in spite of the decrease in the density of the air. In reality this problem is very intimately bound up with another of scarcely less importance, that of devising means for effectively using such power for propulsive purposes. Without attempting any technical discussion of the question, it will be apparent that the whole problem of the operation of the airscrew as a means for absorbing the power of the prime mover and converting it into the propulsion of the plane will depend on the density of the medium in which and on which it operates. Again, in inclining flight a part of the weight of the aeroplane is carried by the pull or thrust of the airscrew. In horizontal flight it is all borne by the planes (assuming the airscrew shaft then horizontal). Hence, the pull or thrust of an airscrew, and indeed its whole regimen of operation, may vary widely according as the plane is climbing or flying horizontally. It thus seems reasonable to conclude that for the best results there should be provided some mode of adjustment or compensation so that the airscrew, as it finds itself operating in a medium of continuously decreasing density, or as it finds itself called upon for varying amounts of thrust or pull with varying angles of climbing flight, may be correspondingly adjusted in order to give continuously the best results.

The problem is further complicated by the fact that the aeroplane itself needs a correlative adjustment. As we have already seen, the one factor in aerial flight which remains sensibly constant under all conditions and at all altitudes of flight is the weight of the plane and its equipment. The vertical supporting force gained from the reaction of the air must therefore be maintained constantly equal to this weight at least for the conditions of horizontal flight, while for climbing flight the weight will be divided and borne partly by the supporting planes and partly by the airscrew. The problem of the economic use of power at varying altitudes and under varying angles of climbing flight involves therefore the following chief elements:—The weight of the plane; surface of the wings and their aerodynamic characteristics; angle of attack of the wings; speed; power developed by the engine; revolutions of the airscrew; area and form of the blades of the airscrew; pitch of the airscrew.

These various factors react and interact in a most complex manner, and any attempt to discuss the problem in detail would carry us too far afield on the present occasion. We may note, however, that the angle of attack is the one feature about the plane which may readily be varied, while there is no feature of the propulsive agent, the ordinary airscrew, which admits of equally simple correlative variation. What is needed with regard to the airscrew is, indeed, some means of realising an adjustment correlative to the change in the angle of attack for the plane. To this end a change of pitch is most suitable, some means of varying, at the will of the pilot, the pitch of the screw in order that with the fixed diameter and area of surface, and with the work available per revolution of the engine as affected by the density of the air, the pitch may be so adjusted as to secure the number of revolutions best adapted to the economic use of the power given out by the prime mover. This will then ensure the thrust needed to overcome the resistance of the plane at the angle of attack and speed which, taken conjointly, will give the lifting force needed to support the weight of the plane, either in whole or in part, according as the plane is flying horizontally or climbing.

All of this somewhat complicated statement means simply that what is wanted is an airscrew with blades adjustable for pitch. Such an airscrew may be realised by so pivoting the blades that they may be turned about a radial axis, thus changing their angle relative to the axis of the screw itself. Extreme changes of such a character result in a very wide variation of pitch from root to tip, and in the end will result

in a serious loss in efficiency. There are therefore two problems involved:—(1) The aerodynamic problem of determining the best form and proportions of an airscrew, the blades of which are intended to be pivotable in this manner, so that under the widely changing conditions of flight which may be met with, there may be effective operation and a well sustained efficiency. (2) The mechanical problem of so designing and building an airscrew with adjustable blades that it will meet the rigorous requirements imposed upon it by the exacting conditions of aeroplane navigation.

It is perhaps not too much to say that the first problem is already well in hand. We know reasonably well what forms and proportions to give to such an airscrew, and if it was only a matter of design of the determination of form and proportion, the problem could hardly be called outstanding. As much cannot be said regarding the second problem. The practical construction of an airscrew with adjustable blades is not an easy matter. Several modes of construction have been attempted, but with only moderate success. The problem is clearly defined, of the highest order of importance and is outstanding as one of the appliances for which the art, of aerial navigation is definitely in waiting.

Stability and Control.

The three fundamental requisites of an aeroplane are strength, movement, and stability with control. We have noted some of the problems arising under the requirements of strength, and movement or propulsion. We may now turn very briefly to a glance at the situation regarding stability and control. Any detailed discussion of these problems would be quite out of the question on the present occasion, and time in any event will only allow us a brief glance at the general situation.

Regarding stability and control it is not too much to say that the general principles underlying these characteristics of an aeroplane are now reasonably well understood, due largely to the splendid theoretical and experimental investigations initiated by British scientists and to which certain workers in the same field in the United States may have contributed something, and by no means overlooking certain important contributions by French and Italian investigators. These investigations, both analytical and experimental, have placed the study of these subjects on a reasonably sure foundation, and have served to mark out the way to secure any desired degree of stability which may be desired or which may be consistent with other valuable qualities. We are here confronted with one of those situations, so frequently encountered in scientific and technical work, where a choice must be accepted on some middle ground between wide extremes, and where the attempt to secure some desirable quality in high degree may lead to a limitation of desirable qualities in other directions.

So it is with stability and control. If stability is carried to an extreme then mobility and quickness of manoeuvring are reduced and control in the sense of ready response is lacking. For military purposes, especially for machines of the fighting type where mobility is of the highest importance, this would be a serious shortcoming, and hence such machines cannot be given too much stability in the ordinary sense of the term. On the other hand, for heavy machines of the bombing type, where mobility of evolution is not so vitally important, the margin of stability may be greater. Going to a still further extreme, it is perfectly easy to build a safe moderate speed family carriage sort of machine which will be stable and secure under almost any conditions likely to develop. Such machines would be scorned by fighting pilots, but when civil aeronautics begins to come into its own after the war and under peace conditions, and there comes a demand for safe machines for civil purposes, including family outings for the week-ends from the city to the country or to the sea coast, then we may anticipate a larger recognition of the qualities making for safety and stability, and we shall find machines provided having such characteristics and in practically any desired degree. Here again, however, there will be degrees of choice, because it will be found that with too high a degree of stability what may be termed the riding qualities of the plane will be poor, while with low stability the riding qualities may be much smoother.

The general problem is therefore pretty well solved so far as the ground work is concerned. This does not mean, however, that there is nothing further for us to learn in this connection. There are many problems of a detailed nature inviting the student of this fascinating field of study

and the solution of which will serve to round out and broaden our general grasp of the problem. In particular, we need further study on the interaction between elements which ensure stability and those which permit mobility and readiness of response to control agencies, to the end that we may control more effectively the combinations which may be desired regarding stability and mobility of evolution.

Again, while the elements of control are well understood, there is room for further study as to the best means of actually developing the control forces required and of applying them to the plane itself. These are partly aerodynamic and partly structural problems, each phase reacting more or less on the other.

One instance of problems of this character will serve to illustrate the type. Thus, we know that an aeroplane is provided with rudder surfaces of two kinds, one to determine movement in a vertical motion, up or down, and the other to determine horizontal motion, right or left. But these motions, vertical and horizontal, assume that the plane itself is horizontal or sensibly so. However, when a plane is circling on a steep spiral or making a quick turn, it is inclined or "banked," in order to avoid side slipping, until, in extreme cases, the wings are nearly vertical, and frequently much more nearly vertical than horizontal. In such cases, the functions of these control services are reversed. Those which, with normal aspects, serve to produce movement right and left will now serve to determine motion rather in a vertical direction, and those which formerly served for movement up and down will now serve to determine motion to the right or left. For intermediate angles of bank, each set of control surfaces will give control forces in both directions, up or down and right or left. Now, it is by no means sure, having in view this double and interchanging function between these two sets of surfaces, whether we have as yet realised the ultimate and best arrangement either as regards the surfaces themselves or their control by the pilot. It seems decidedly probable that we have not and that some arrangement yet remains to be devised which will be more effective in the matter of this double and interchanging function of control, and simpler in its relation to the pilot. This and the other like problems are still awaiting investigation and offer a delightfully promising field for the further study of the aerodynamic engineer.

Armament and Instruments.

There still remain two large and important fields, rich in aeronautic problems. These are armament and instruments. I shall attempt no more than the briefest general reference to these two classes of problems. Those arising under the head of armament are, of course, strictly military in character, and but little of interest could, in any even, be said in a public address. Such problems relate naturally to the number, type, and size of guns to be carried, their mounting and special sights; bombs and devices for carrying, aiming, dropping, &c.; questions of armour and protection of vital parts against gunfire or shrapnel bursts, &c. Expressed in their most general terms, these problems resolve themselves

into an attempt all along the line to meet the requirements imposed by the desired military uses of the plane, and to anticipate or improve upon the devices and designs of the enemy in the same fields.

Regarding instruments, little more specific can be said. This field does, however, bristle with problems of the highest interest to the scientist, and may well challenge his best efforts. It is interesting to note the extent to which the modern aeroplane has become a flying meteorological and physical laboratory. Thus, a recent list of aeroplane instruments shows some 25 or 30 different instruments and devices, not indeed all to be carried on one plane, but all included in the general aeronautic military programme, and each serving some specific and important purpose. With these instruments as with armament, the problems reduce themselves to an effort to meet the military or the navigational and operative requirements of the situation, and in these days of war in particular, to anticipate or improve upon the similar devices and designs of the enemy. Much of the work relating to these problems under armament and instruments is already done and well done. There do remain, however, many problems, especially of detail or of improvement, and which must be considered as outstanding; but of these I shall attempt no mention or discussion.

By way of conclusion, reference may, for a moment, be made to a problem of the most vital and far-reaching economic importance, and which will be upon us with the arrival of peace conditions. This is the problem of the best economic utilisation of the enormous investment which has been made in aeronautic production, expressed in terms of money and human time and energy, and now represented by factories, machinery and equipment, finished product, trained industrial organisations, human skill and productive capacity.

The discussion of such a problem might well occupy our careful attention for the entire hour, but I can no more than mention it here by name. We can, however, scarcely over exaggerate its importance, and the appointment of important commissions in England and in the United States for the study of the problems arising under this general head is an evidence that their serious import is appreciated, and we may hopefully await suitable measures of adjustment against the day when we may again turn our thoughts to the occupations of peace.

And so with all our problems; we can only look hopefully forward for the future to give to us such measure of answer as our patience and study may merit.

Of one thing, however, we may be sure, and that is that the day will never come when we have no more problems to solve. But, on the contrary, the number of problems still outstanding, as the years go by, is likely, rather, to increase with our acquaintance with the subject, and we may be sure that before this or any like audience under the auspices of the Aeronautical Society of Great Britain, there will never lack material for a discussion of "Outstanding Problems in Aeronautics."

Back from Germany.

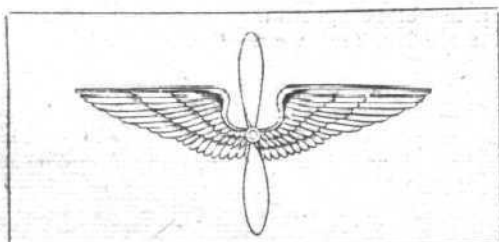
It is officially announced that the following officer, who was a prisoner in Germany, has now arrived in this country:—
Wood, Lieut. R., W. York R. and R.F.C.

A New American Ace.

THE American Aviation Corps has another "ace," Lieut. Meissner, of Brooklyn, being officially credited with having destroyed five German machines. Paris newspapers report that the American aviator, Putnam, has to his credit at the present time ten victories, seven of which were achieved in June, thus equalling the monthly record of Lieuts. Guynemer and Dorme.

New U.S. Aviation Badges.

THE new collar badge worn by officers of the U.S. Aviation Service is shown in the attached sketch. It consists



of a silver propeller one inch in height, with bronze wings 1 1/4 inches from tip to tip. Enlisted men will wear a regulation

size button, showing the same design, on one side of the collar, while on the other side the bronze U.S. will be worn. The hat cord of the U.S. Air Service is green and black.

Belgian Honour for Flying Officers.

It was announced in a supplement to the *London Gazette* on July 12th that the following decorations had been conferred by the King of the Belgians for distinguished services rendered during the course of the campaign:—

Croix de Guerre.

Capt. A. J. R. Waller, Essex R. and R.F.C.; Capt. W. H. Anderson, Aus. F.C.; Lieut. B. J. Blackett, Aus. F.C.

The French Aces.

LIEUT. NUNGESSER has increased his tale of German machines destroyed to 38, and Lieut. Madon to 36—although unofficially the latter claims 89. Lieut. Fonck tops the list of French "aces" with 49 victims. Maurice Boyan is an "ace" specialising on kite balloons, of which he has 114 to his credit.

Flight Sub-Lieut. Marinovitch was mentioned in the official *communiqué* of July 8th for his twelfth victory.

Adjutant Montrion (11 victories) and Sergt. Gérard (8) have been reported missing. Lieut. de Gramont, who was in command of an American squadron, is reported missing after a patrol. He was the son of the Comte de Gramont, the well-known member of the Academy of Science, and had served as an interpreting officer with the British Army.

AIRISMS

FROM THE FOUR WINDS.

It would seem, according unto Alderman Owen A. Clark, Mayor of Bury St. Edmunds, that after all we, in very good company, have been shamefully libelling the Hun—the real thing, not the 1914-18 “improvement”—in placing the Blonde Beast in the same category as the Huns of old. Said Alderman Clark, at the demonstration on Saturday in Trafalgar Square, advocating a clean sweep by either internment or deportation of the whole range of camouflaged Britons, he strongly objected to the Germans being called Huns. He had read up the history of the Huns, only to find that while they were a damned bad lot they were gentlemen compared with the Germans. “Let the Germans,” he continued, “be handed down to posterity as Germans, Germans, Germans—a name representing everything that is beastly, abominable, and contemptible.”

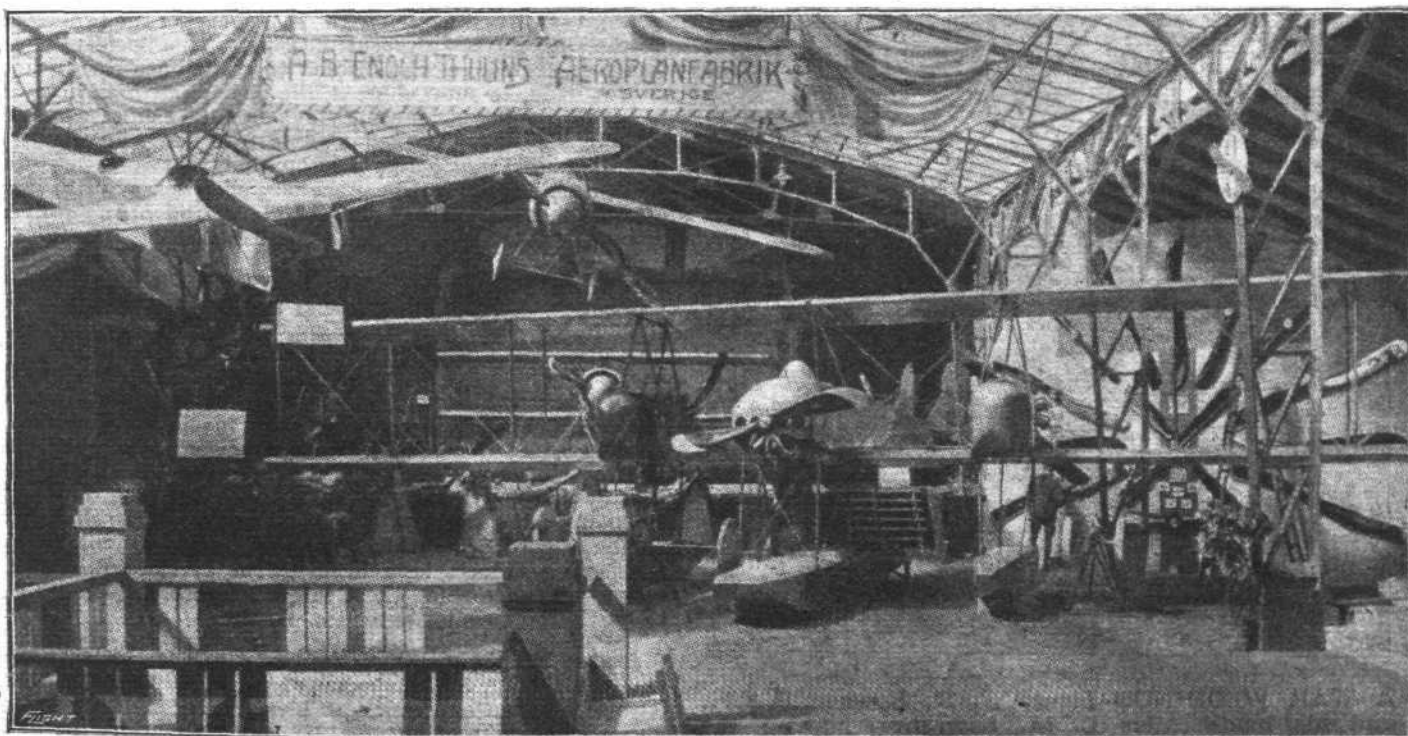
NEEDLESS to say, after this, one can accept from Alderman Clark that he is a “whole-hogger against the Germans,” and that they being an accursed race he suggests that, instead of internment of them all, we should rather leave out the letter “n” and start business on them forthwith. Anyway there are a good many more who are in profound sympathy with the spirit of the Trafalgar Square meeting, and it looks as if the powers that be would be wise in recognising it and bowing to the storm.

Apropos the recent aircraft factories’ strike, a friend of “The Londoner,” who visited certain of the works affected, sent the following notes of his visits: “I talked to some of the strikers and others. From what they said, about 99 per cent. of them did not want to strike, but had been jockeyed into doing so. There is no doubt that there are some people fomenting trouble, but they are pretty clever and don’t appear. The men seemed to believe that their unions had called them out. This seems to be where the Government muddled. The unions should have been called on to disavow this suggestion in a very decided way, and the Government should take the step in all cases of strikes which are unauthorised

by the unions of automatically cancelling all food cards held by the strikers.

“In this particular case the foreman should not have had the power to dismiss any man ‘on his own,’ but having done so, if when the man came back and blew a whistle, the foreman had given him ‘one on the jaw,’ and run him out, he would have had the sympathy of the rest ‘as a man.’ To shelter himself behind the ‘law’ was, and always will be, a mistake not appreciated by the men.”

WHICH makes it look all the more as if the M.O.M. had made a shocking mess of things—whether deliberately or unconsciously. It has about it the smack of spreading the cult of bureaucracy, which is now causing so much concern in every direction in the ranks of far-seeing and sober-thinking people. It is this official spirit of absorption which is abroad which is giving many to think furiously upon the future. It is a year or so back—during the war—that “FLIGHT” first sounded the alarm upon this very vital subject, and it is only within the last dozen months or so that the significance of our repeated warnings has begun to dawn upon the many, who had other matters at the time with which they were more intimately concerned, to bother about this growing Frankenstein. It is this insistent spreading of the cult of bureaucracy which called forth the other day from Mr. Samuel Garrett, the retiring President of the Law Society, a solemn statement in regard to the exercise of bureaucracy in relation to various war Acts and regulations with which the legal profession has to deal. It would be a duty, he said, after the war to see to it that the shackles of officialdom, necessary during the war, were as soon as possible loosened. When some men got into official chains they seemed to suffer from a total inability to remember that they were the servants and not the masters of the public. There were not wanting signs of an inclination to continue and extend the system of bureaucratic control, which was a great danger, and foreign to our character and disposition. It was their duty to expose this tendency, and see to it that



FROM THE CHRISTIANIA AERO SHOW.—The stand of Enoch Thulins Aeroplane Works. On the left is the Blériot monoplane on which Lieut. Tryggve Gran crossed the North Sea; hanging from the roof is a sporting monoplane; in the background is seen a biplane single-seater fighter; and in the centre a three-engined seaplane, all built at the Thulin works at Landscrona, Sweden.

after the war the liberties of the people were restored as quickly as possible.

THE present unnaturalised and naturalised German scourge will be as but a mild epidemic to the cancerous growth of bureaucracy which will have fastened its talons into long-suffering John Bull, by the time the war is concluded, if steps as an antidote are not thought out and organised in advance against that time.

By way of commentary upon the ways and methods of employers and employees in their relation to each other, a document from the Curtiss aeroplane people the other side comes somewhat opportunely. This item of news sets out the plan adopted by the Curtiss Corporation towards fostering the development of industrial morale in their works by the establishment of a "Square Deal" department in the Division of Education and Welfare.

THIS Square Deal department is for the benefit of all Curtiss employees, whether in factory or office. Its purpose is to apply the square deal to all employees and to the company itself, by removing the causes of any dissatisfaction that may arise and by placing employees in the positions for which they are best fitted. Any employee who feels that he or she has been unjustly dismissed, overlooked in promotions, assigned to duties for which they are not best fitted, neglected in wage advances or made the victim, real or imagined, of favouritism by foreman or superintendent may bring complaint to the Square Deal department. An investigation is made immediately.

IN effect the Square Deal department is a court of appeals. No man or woman may leave the organisation, either by way of dismissal or desire to quit, until the Square Deal department has reviewed the case. Disagreements, misunderstandings, complaints of favouritism, and ordinary dissatisfaction result, so the Curtiss Corporation claims, under the old system in a heavy labour turnover. Companies fre-



Not a cake walk contest, but King Haakon and Queen Maud of Norway as interested spectators, on the occasion of the Aero Show in Christiania, of the evolutions of the aviators, one of whom looped several times on a flying boat.

quently lose workers with capacities which could efficiently be used in some other department. The Curtiss Square Deal department thus serves the company no less than the worker through this extension of welfare activities.

THE announcement of Lord Weir's new title caused a certain amount of disappointment in a well-known West-End club, where some humorist had been advocating the suitability of "Lord Weir de Weir"! Another suggestion, which we understand originated in his own family circle, was "Lord Wearie Willie"!

MR. A. V. ROE recently experienced his first forced landing for several years. The tall ladder on which he was chasing the nimble cherry let him down badly, but with his usual ability he landed on his feet and escaped with a severe shaking, although he came down a long way. Congratulations to a popular pioneer who could ill be spared.

AVIATION, like good wine, now needs no bush, and by its own weight of fascinating possibilities is in no need of a special Society for its Propagation. The latest instance of the spread of its cult is in connection with the Society for the Propagation of the Gospel. At a recent meeting of this Society, a letter was read from one who offered to contribute a substantial sum in order to supply one of the bishops with an aeroplane to enable him to visit the outlying parts of his diocese overseas. Although it has not proved possible to accept the offer, there is little doubt, the Society is of opinion, that in a few years' time similar offers will be gratefully accepted, and that some of the bishops who are in charge of large and widely-scattered dioceses will thus be enabled to multiply their activities.

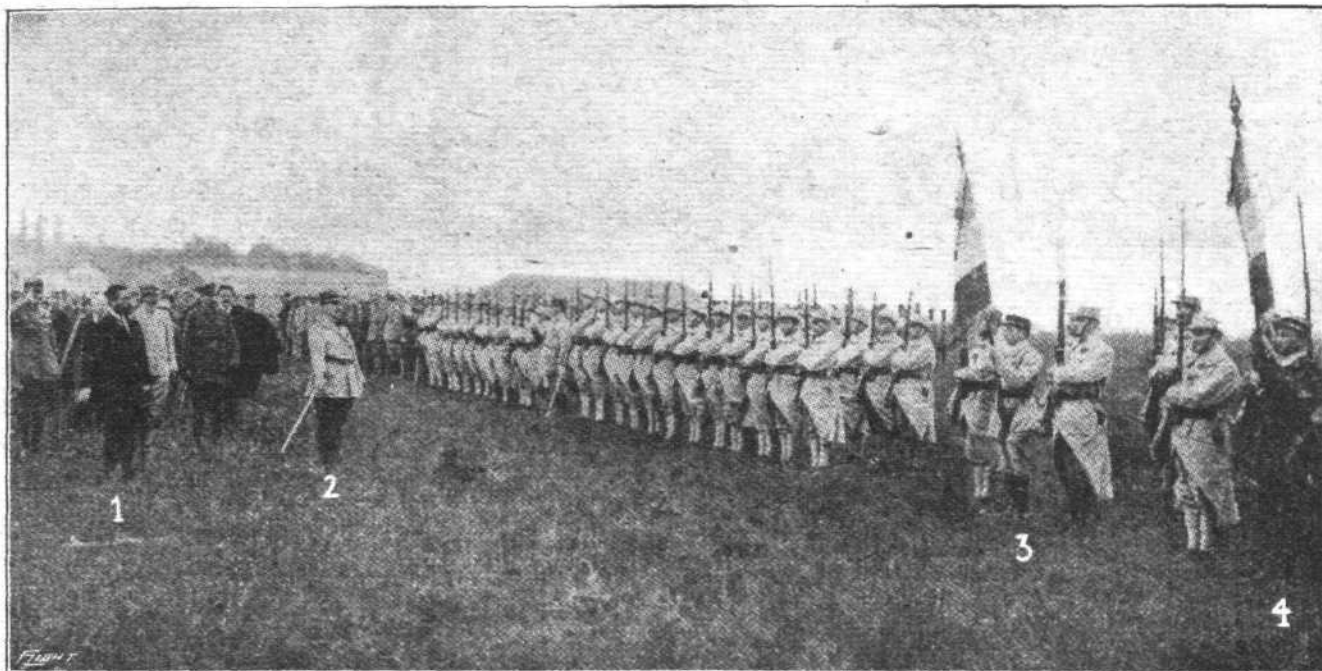
COMMENTING upon this very live proposition, a Dundee newspaper thinks it may suggest interesting possibilities to churches which know nothing of bishops. We frequently hear of Scottish parishes, says our contemporary, particularly in the Highlands and Islands, of so extended a geography and so poorly provided with roads that the minister has every excuse for neglecting the visitation of his flock. Give him an aeroplane and it will be within his power to drop into their best grazing any fine day. Whether they will be entirely gratified to find their spiritual mentor dropping down upon them from the sky is a question on which we refrain from saying a word. The thing, however, is one to look for, and the jeering sailor's designation of the parson will acquire a new significance when the General Assembly starts its fund to buy aeroplanes for extended parishes.

AMONG the recipients of the Order of the British Empire was the chief A.I.D. inspector at a certain aircraft factory. To use his own expression, "I was never so astonished in the whole course of my life! I kept on reading the list in *The Times* all that day. . . . But it was too bad of my friends to congratulate me on being in the 47,000!"

GLANCING over some faded old photographs of aeronautical dreams as wild as that of Icarus, set us thinking of old days in the States, when young Eugene Ely was flying, and Glenn



A WAR WEDDING.—Lieut. W. H. Bowker, R.A.F., and his bride (Miss E. M. Lawrence) leaving the Brixton Parish Church after the ceremony. The bridegroom has a record of two years' service in France, where he gained the Military Medal and the Mons Star. He is the inventor of a very much improved machine-gun mounting for use in aircraft, which has been universally adopted by the R.A.F.



The Presentation of Aeronautic and Aviation "Colours" to the First French Aviation Group at Longvie (Cote d'Or) Aerodrome on June 20th.—The colours were presented by M. Dumesnil (1), French Under-Secretary of State for Naval and Military Aviation, and were received by Capt. Battle (4) and Lieut. Fonck (3), the French aces. The troops at the aerodrome were under the command of Col. Girod (2), Inspector-General of Aerodromes and Aviation Schools.

Curtiss was an unproved man, known only for a sensational motorcycle performance.

A pilot was largely a showman in those days, the crowd turned out in much the same spirit as that in which the citizen of Rome planked down his sestertius; they anticipated plentiful excitement, and there *might* be a killing. Many a good man went up against all reason to please a jeering crowd, and paid with his life. There was even the horrible case of the souvenir hunter who fled with a snapped spar, still wet and smoking . . . that he had snatched. But there were better memories, 'Gene Ely, with his sturdy but primitive little Curtiss, with the old model "O" vertical four-cylinder engine, the first man to fly from and alight on the deck of a battleship; old Doc. Greene with the home-made 'bus that he and two enthusiastic college boys made in a vacation near Rochester, with an Elbridge two-stroke engine; the mad ice yacht we made with an 100 h.p. aero engine and propeller drive, its appalling speed, the way one man was flung off at a curve once, so that the smooth ice cut away leather waistcoat, wool sweater and all from his arm, leaving him handsomely scarred; the aviation meeting we promoted, and the way the stolid public sat on the hill side *outside* the pay enclosure, and our rueful faces afterwards, when we came to tot up expenses!

In that year Glen Curtiss was billed to fly from Albany to New York, down the Hudson river. Time and time again he judged the weather conditions unfavourable, until the disgruntled newspaper reporters gave him up as a bad job, and went home—all but one. The very next morning he made the flight, and his name with it.

The Royal Visit by Seaplane.

THE King and Queen of the Belgians have always been unconventional, but the public had somewhat of a surprise when it became known that their Majesties had crossed over to England in seaplanes to take part in the Royal Silver Wedding celebrations. They arrived off the coast about 6.15 p.m., and came ashore by motor launch. The return journey was made in the same way a week later. The pilot of the Queen's seaplane was Adjutant Boin, a famous swimmer before he joined the Belgian Air Service, while the King's pilot was Lieut. Ortha. A French scouting aeroplane piloted by Naval Lieut. Noirot acted as escort. During the flight Queen Elizabeth constantly took photographs and asked a number of questions on a slate.

Good Air Work in Macedonia.

THE activity of the Allied air service on this front, particularly in the British sector, is continually increasing, says the *Times* correspondent at Salonica. Hardly a day passes without several bombing raids behind the enemy lines, whereas the enemy air service is visibly weakening.

Good old days, and none the worse for the blissful uncertainty as to whether the old 'bus would fly or not.

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister Journal) of July, 1908. "FLIGHT" was founded at the latter end of 1908.

THE BLÉRIOT AEROPLANE.

M. Blériot has made further progress, and has succeeded in accomplishing a flight of 6 kiloms. in 5 minutes 47 seconds at Issy on Saturday last, and but for a burst water-pipe would probably have remained in the air for a considerably longer period.

ITALIAN MILITARY AIRSHIP.

The Italian military authorities have just completed a dirigible which has been constructed on Lake Braciano at a cost of £16,000. In length it measures 60 metres, and the envelope has a cubic capacity of 2,500 cubic metres. Accommodation for a nominal crew consisting of a captain, pilot and two men is provided by means of a central platform, with cars at either end.

THE CURTISS AEROPLANE.

It is reported from New York that Mr. Glenn Curtiss succeeded in flying a distance of 1,093 yards in 1 min. 15 secs., before several thousand spectators at Hammondsport, New York, on Saturday, July 4th, and thereby won a trophy for making the first officially-observed test.

Holland Protests.

THE Dutch Government, it is said, have lodged protests with both Great Britain and Germany against the appearance of British and German seaplanes over Dutch territorial waters off Ameland on June 30th.

Sir Charles Wakefield's Souvenir.

Nor the least valued of Sir Charles Wakefield's interesting collection of souvenirs and relics of the war is his latest addition, "Hell Fire Corner," the historic board fixed by the Canadians in October, 1914, at the Menin Gate at Ypres. It was secured by Sir Charles Wakefield at the sale on France's day.

German Aircraft in Siberia.

ACCORDING to the military correspondent of the Japanese *Yorodzu*, two German aeroplanes which participated in the fighting at Novo Nicolaievsk are being transported to Khabarovsk, on the Amur. Six others are at Irkutsk, all piloted by Germans. In Russia proper 100 machines have been used against the Germans, and there is every reason to believe that these are also being transported eastwards.



Casualties.

Capt. JAMES DACRES BELGRAVE, M.C., Oxford and Bucks L.I., attached R.A.F., who was killed in action on June 13th, was the second son of Mr. and Mrs. Dalrymple J. Belgrave, of County End, Chinnor, and was 21 years old. He was educated at Bedford School and Sandhurst, passing eighteenth in August, 1914, and receiving a prize-cadetship. He obtained his commission in the Oxford and Bucks L.I. (52nd) in December, 1914, and went out to the front the following spring. He was wounded at Loos on September 25th, 1915, returned to the front in the spring of 1916, and later joined the R.F.C. He was flying in France from November to June, and was then awarded the M.C., receiving a well-earned bar to his M.C. a short time ago.

Sec. Lieut. PHILIP (ANGUS) BERTRAND, R.A.F., who was killed in action on June 16th, was born in 1890, the second son of Captain Felix Bertrand, R.T.O., and Mrs. Bertrand, of 10, Warwick Street, Regent Street. Lieut. Bertrand, who was well known in fencing circles, began fencing at a tender age, under his father at Warwick Street. Subsequently he went to Belgium as a pupil of Verbrugge, and later to Paris as a pupil of Rouleau, with whom he remained until the outbreak of war. He exhibited a rare gift; and his future as a fencer was one of great promise. At the International Tournament at Ostend, which was actually in progress when war was declared, he won *une médaille spéciale*. He followed his elder brother into the R.A.F., qualified as pilot in March last and went to France in May.

Lieut. CHARLES GEOFFREY CLAYE, Sherwood Foresters and R.A.F., aged 23, who was killed on July 5th, was the only son of Mr. and Mrs. W. E. Claye, of Lenton House, near Nottingham. He was educated at Hinwick House, Wellingborough (Mr. Gruggen's) and Charterhouse (Hodgeson's), received his commission in the Sherwood Foresters in September, 1914, and went to the front in August, 1916. He transferred to the R.F.C. in March last year, and was wounded in the following May. Last January he was given a post as instructor in aerial navigation and bomb-dropping in England, but asked to transfer to the front again in April.

Capt. PHILIP CHALMERS COWAN, Manchester Regt., attached R.F.C., reported missing on November 8th, 1917, and now officially presumed to have been killed on that date, was the second son of Mr. and Mrs. P. C. Cowan, of 33, Ailesbury Road, Dublin, and was aged 22. He was educated at Castle Park, Dalkey, and Marlborough College, and was in the Medical School of Trinity College, Dublin, when, in August, 1914, he got his commission through the O.T.C. He transferred to the R.F.C. in October, 1916. His younger brother, Capt. Sidney Edward Cowan, M.C. (two bars), was killed on November 17th, 1916.

Sec. Lieut. J. N. GATECLIFF, R.A.F., who was killed in action on June 29th, was the only son of Mr. and Mrs. James Gatecliff, of Birchington, Kent, and only grandson of the late John Charles Stead, J.P., of Stoneycroft, Liscard, Cheshire, and was in his 21st year. He was educated at Magdalen College School, Brackley, and Woodford House School, Birchington. He joined the East Kent Yeomanry, serving as a trooper for 18 months, and then transferred to the R.F.C. He and his observer manned one of the 36 machines, the crews of which made the supreme sacrifice during the week June 27th to July 3rd, when 179 German machines were accounted for.

Lieut. GEORGE AUGUSTUS BELLAIR ROSS, King's Liverpool Regt. and R.A.F., who was killed in action on June 1st, aged 27, was the eldest son of Thomas George Ross, of Durban, Natal, and grandson of the late James Augustus Ross, formerly of Catherstone, Dorset, Esquire.

Lieut. N. SALES, R.A.F., who was killed in action on June 30th, aged 23, was the son of Maj. W. Sales, R.F.A., of Sheffield.

Capt. DOUGLAS RIDLEY CLUNES GABELL, Gloucestershire Regt. and R.A.F., and Lieut. GEORGE FREDERICK DELMAR-WILLIAMSON, Black Watch and R.A.F., who died as the result of a flying accident in Wiltshire, were both sons of Cheltenham

residents—the first-named of the Rev. A. C. Gabell, of Battle-down Gates, formerly rector of Swindon (Glos.), and the other the only son of Mr. F. Delmar-Williamson, of Lansdown Place, a well-known singer. Capt. Gabell was 20 years of age and his companion 19. Both of them were experienced flying officers, and had passed through Cheltenham College and Sandhurst.

Lieut. ALAN HEYWOOD, R.A.F., who died abroad on June 20th from scarlet fever, was 23 years of age, and the eldest son of Mrs. Heywood, of Whitkirk, Leeds, where he was born. He was educated at the Drax Grammar School, and was married only ten months ago to Miss Lightfoot.

Lieut. F. N. MARCHANT, who has been killed in a flying accident in Italy on June 6th, was the elder son of Mr. T. D. Marchant, of Eastwood, Bramley. Lieut. Marchant, who was only 20 years of age, joined the Royal Flying Corps in 1915. He served one year and four months in France, and was granted his commission in August, 1917. He proceeded to Italy in March last, and was promoted full lieutenant R.A.F., in April. Previous to joining the Army he was employed in the office of the Friary Brewery Company, of Guildford. On the day of his death, Lieut. Marchant returned from a patrol with magneto trouble, which was remedied, and he went off again. When at a thousand feet he did a sharp turn, and went into a spin, from which he did not come out. Deceased was buried with full military honours, and a large bearer party carried the coffin from the village square up the hill to the British cemetery.

Lieut. MAURICE FORD OAKLEY, R.A.F., who was killed in an aeroplane accident on July 3rd, aged 19, was the son of Harry E. Oakley, O.B.E., M.Inst.C.E., of 10, Russell Road, Kensington.

Lieut. JAMES JOHN SCARAMANGA, R.A.F., who died of wounds on July 10th, in his 20th year, was the younger son of Mr. and Mrs. John Scaramanga, 259, St. James's Court, Buckingham Gate.

Missing.

Sec. Lieut. A. C. HOWELL-JONES, R.A.F., who is reported as missing, is the only child of Madame Howell-Jones, Bushy Park, Bristol, and belongs to the Brock family of Guernsey. He was 18 years of age, and got his commission at the beginning of the year, proceeding to France in April. He has been in a good amny air fights, and on one occasion, while on special work over the enemy lines, was attacked by eight German machines, and his machine was the only "Britisher" on the spot. He brought down one, and dispersed the other seven. On a previous occasion, in a "bulldog" fight, when a large number of machines were engaged, he was attacked by ten "sitting on his tail," but dispersed them.

Married.

Capt. A. DOUGLAS S. BARR, R.E. and R.A.F., eldest son of Emeritus Professor Archibald Barr, LL.D., and Mrs. Barr, of Westerton-of-Mugdock, was married on July 9th at Milngavie and Baldernock U.F. Church to MAUDE CHARLOTTE, younger daughter of Mr. and Mrs. H. ARNOLD WILSON, of Underfell and Craigmaddie, Milngavie.

Capt. H. C. BROCKLEHURST, Hussars and R.A.F., brother of Sir Philip Brocklehurst, of Swythamley Park, Macclesfield, was married to Lady HELEN MITFORD, second daughter of the late Lieut.-Col. the Earl of Airlie and the Dowager Countess of Airlie, on July 11th, quietly in London.

Lieut. PERCIVAL HAROLD DAVY, R.A.F., younger son of the late S. H. M. Davy, of Paignton, Devon, and of Mrs. Austin Batty, Sharrow Head House, Sheffield, was married on July 11th at St. Mark's Church, Sheffield, to MURIEL, younger daughter of the late SYDNEY STEEL and of Mrs. Steel, of Bournemouth.

Sec. Lieut. RICHARD GEOFFREY HOLLWAY, R.A.F., only son of Geoffrey and Alice Hollway, of the Hollies, Sunbury-on-Thames, was married on July 8th by special licence at St. Marylebone Parish Church, to FRED, only child of FOLLETT THORPE, Barrister-at-Law.

Capt. ALFRED ANDREW MARIS, Suffolk Regt., was married on July 9th at Emmanuel Congregational Church, Cambridge, to BLANCHE BEATRICE BLOWS.

Capt. GEOFFREY P. NEALE, R.A.F., of Brentwood, was married on July 9th at St. Stephen's Church, Hampstead, N.W., to STELLA B. WILD, of King's Road, Westcliff-on-Sea.

Major R. H. C. ROUTLEY, Royal Fusiliers, attached R.A.F., was married on July 9th at the Chapel Royal, Savoy, to MARY SYLVIA, only child of Professor and Mrs. Percy GROOM, of "Pinhurst," Gerrards Cross.

Items.

Major-General F. H. SYKES (Chief of the Air Staff, R.A.F.) and Lieut. J. B. ROBINSON, R.A.F., had the honour of being received by the King at Buckingham Palace on the morning of July 1st.

Lieut. SEDLEY WILLIAMS (Devonshire Regiment, attached

R.A.F.) had the honour of being received by His Majesty at Buckingham Palace on July 10th.

A memorial service for Major JAMES ARTHUR, R.A.F. son of the late Mr. Thomas Glen Arthur and nephew of Sir Matthew Arthur (the new peer, who is taking the title of Lord Glenarthur), was held on July 4th, at St. Peter's, Eaton Square, when Princess Beatrice was represented by Mr. Victor Corkran.

Mr. W. H. ALLEN, chairman of W. H. Allen, Sons, and Co., engineers, Bedford, has sent a donation of £500 to the Bedford County Hospital in commemoration of the recent Royal visit to Bedford.

Under the will of Capt. GILBERT HENRY MILLAR, R.A.F., of Heathdown, Hampstead Heath, N.W., who was killed while flying on April 19th, £300 is left to the Warspite Training ship and £100 each to the National Lifeboat Institution and the Merchant Seamen's Orphanage. The will is proved at £5,946.

THE DEATH OF MAJOR McCUDDEN, V.C.

It is with the greatest regret that we have to record the death of Maj. J. T. Byford McCudden, V.C., D.S.O., M.C., M.M., of the R.A.F., who was accidentally killed on July 9th while flying to France. It appears that he had flown from England to rejoin his squadron in France. He landed at a depôt, and having refilled his petrol tank restarted on his

de Guerre. He had crashed 45 enemy aircraft, and in addition had driven down 13 whose fate was not quite certain.

He enlisted at 15 in his father's corps—the Royal Engineers—and transferred to the R.F.C. when he was 18. His eldest brother, Flight-Sergt. W. T. J. McCudden, was killed at Gosport in 1915. Another brother, Sec. Lieut. J. A. McCudden, R.F.C., has won the Military Cross, and his youngest brother is a boy in the R.A.F. at Farnborough.

BARON CARL CEDERSTRÖM.

In our last issue we had to record the death of the well-known Swedish aviator, Baron Cederström, when flying the Baltic. It is now reported from Copenhagen that the body has been found in the Aaland Sea and taken to Stockholm for burial. Baron Cederström, it was reported last week, accompanied by Capt. Krokstedt, chief of Cederström's flying school, was delivering a seaplane to Finland, flying across the Gulf of Bothnia. It is to be presumed that engine trouble forced



The late Major James Byford McCudden, V.C., D.S.O., M.C., M.M., Croix de Guerre, of the R.A.F., who was accidentally killed in France on July 9th whilst proceeding to his squadron.

journey. He had not proceeded far, however, when his machine crashed to the ground and he was killed.

Maj. McCudden, who had only just been promoted major, was 23. He went out with the B.E.F. as an air mechanic, and was an observer at Mons. He became a flight-sergeant and won the Military Medal in September, 1916, for destroying an enemy machine and forcing two others to land. He was then given a commission, and in February, 1917, was awarded the Military Medal and in the following August was granted a bar. Three months later he was awarded the D.S.O. and a bar. Last March he was given the Victoria Cross, and a few days ago was awarded the Distinguished Flying Cross, while he had also received the French Croix



The late Carl Cederström, the well-known Swedish aviator, and manager of the Nordiska Aviatik Aktiebolag, Tellusborg, Sweden, who recently lost his life whilst flying the Baltic.

the machine to descend, and that the occupants were drowned before their whereabouts could be ascertained. We have received from a correspondent, who was personally acquainted with the late Baron Cederström, the following brief appreciation:—

"With the death of Baron Carl Cederström, Scandinavian aviation loses one of its most picturesque figures. Being a member of one of the oldest noble families of Sweden, Baron Cederström was always a keen sportsman, and it was only natural that when aviation was added to the other branches of sport he should become an enthusiastic aviator.

Obtaining his brevet in France, No. 74, on May 2nd, 1910, on a Blériot monoplane, he purchased one of these machines and brought it back with him to Scandinavia, where he did a considerable amount of flying in 1910. As a typical instance of the daring of the late Baron Cederström, the writer may mention a recollection he has of him from the Amager Aerodrome at Copenhagen. Coming down at the far side of the aerodrome, Cederström was too impatient to wait until mechanics could get across to start his engine, and so he jumped out of the machine, leaving the switch on, and swung his propeller. Diving under the wing as the machine gathered speed, and catching hold of the fuselage of the machine, which was by then already moving along at a good pace, he swung himself aboard and rose gracefully into the air. This performance was repeated not once, but several times. The Blériot monoplane, which was known as the 'Bilbol,' after the Automobil Bolaget, of which Cederström was then a director, soon became well known all over Scandinavia, and Cederström worked strenuously to arouse Swedish enthusiasm

and to persuade influential firms to start a Swedish aeroplane factory. There were few, however, who took him seriously, most people arguing that the Scandinavian market was too small, and that it would be futile to attempt to compete with large industrial countries such as England, France and Germany. However, Cederström persevered, and when he found that he could not get a firm to establish a factory exclusively for the manufacture of aeroplanes, he persuaded, in 1913, the well-known Södertälje Works to establish an aviation department, of which he became the director.

"A couple of years later Cederström was able to realise his purpose of establishing a factory exclusively for the construction of aeroplanes, the firm which is now known as *Nordiska Aviatik Aktiebolaget*. As technical director of the firm he was fortunate enough to secure the services of Ingenior Lars Fjällbäck, formerly the proprietor of *Svenska Aeroplanfabriken*, and the firm has since built a number of different types of machines, both for the Swedish Government and for Finland, as well as running a successful flying school, the chief instructor of which was Capt. Krokstedt, who accompanied Baron Cederström on the last fatal journey.

"The late Baron Cederström was in stature and spirit a typical Scandinavian of the Viking type, as the accompanying photograph of him in flying rig will show, and his many friends will greatly feel his loss. He was a charming comrade, a staunch friend, but he was first and last a man, and in the sorrow over his death we may be comforted by the thought that he died as he would no doubt have chosen to die. Strädöden for Cederström would have been unthinkable."

AVIATION IN PARLIAMENT.

R.N.A.S. Men and the Royal Air Force.

MR. SNOWDEN in the House of Commons on July 8th asked the Under-Secretary of State to the Air Ministry what is the position of men who only recently were attached to the Royal Naval Air Service owing to the Royal Flying Corps and the Royal Naval Air Service having been combined in the Royal Air Force, seeing that, according to the third Clause in the Royal Air Force handbook, the men may, within three months from the 1st April, give notice that they do not wish to be transferred to the Royal Air Force; what provision is there for men transferring from the Royal Naval Air Service remaining in the naval service; and whether men formerly attached to the Royal Naval Air Service can have provision made for them in the motor-boat or other branch of the Navy?

The Under-Secretary of State for the Air Ministry (Major Baird): The position of such men is that if they give notice within a period of six months from April 1st, 1918, by application to the officers commanding their respective units, that they do not wish to be transferred to the Royal Air Force they will cease to belong to that force. The question of their subsequent employment will then be a matter for the Admiralty to determine.

Enemy Towns (Bombardment).

SIR RICHARD COOPER asked the Under-Secretary of State for War if he is in possession of information that would point to the enemy taking advantage of the decision of His Majesty's Government to refrain from bombarding Cologne on Corpus Christi Day for the purpose of moving troops or military supplies in the privileged area?

Mr. Macpherson: The answer is in the negative.

Essex Aerodrome.

MR. JOYNSON-HICKS asked the Under-Secretary of State to the Air Ministry what are the terms upon which the contractor is building an aerodrome in Essex; whether payment is by commission; whether, in May last, bricks were laid on a straight course at the rate of one in four and a half minutes; whether the men, after the bell to resume work had rung, did not go back for a quarter of an hour; whether card-playing was rife during working hours; and whether he will cause an enquiry to be made as to the whole conduct of the work at this aerodrome?

Major Baird: The contractor is paid by commission which, under present conditions, is the only practicable system. The information received in the Air Ministry does not bear out the suggestions contained in the third, fourth and fifth parts of the question, and there does not appear to be any reason for special enquiry on the conduct of the work at this aerodrome.

Royal Air Force (Uniform).

SIR F. HALL on July 11th asked the Under-Secretary of State to the Air Ministry whether a further alteration is likely to take place in the uniform, which has been in existence about three months, of officers and men of the Royal Air Force; and, if so, whether, considering the shortage of labour, the loss of material, the cost to officers concerned, and the request of the Government to economise and not to waste labour, he will immediately give instructions that such contemplated alteration is not to be carried out during the War?

The Under-Secretary of State to the Air Ministry (Major Baird): The answer to the first part of the question is in the affirmative. The introduction of the new uniform was decided upon by the Air Council, after the fullest consideration of all the factors involved. No additional labour will be required; no loss of material is involved, as all khaki uniform will either be worn out before it is replaced, or it will be cleaned and repaired and returned to the Army for reissue; no additional cost is involved to the State, as the new uniform costs less than the uniform hitherto worn by the Royal Naval Air Service and the Royal Flying Corps. Officers will only be called upon to provide themselves with the new uniform when that which they are at present wearing becomes worn out, and no compulsion will be exercised to make them get it earlier.

SIR F. HALL: May I ask if it is a question of economy to alter the existing uniforms for a new branch of the Service, instead of supplying them with a new uniform, and allowing those that have been made for the Air Force to be entirely worn out before there is any question of alteration?

Major Baird: I am afraid I did not make myself quite clear. I did say the uniform will be worn out before it is replaced.

SIR F. HALL: Then it is to be understood that the existing uniforms are not to be altered for either branch of the Service? I hope the hon. and gallant gentleman will make this perfectly plain.

Major Baird: I am afraid I do not quite see my hon. and gallant friend's point. The Air Force uniform will be different from that worn by the Navy and Army. There are three different Services, but not three different branches of one Service.

SIR F. HALL: Why should it be necessary, after being in existence only three months, to have an alteration in this uniform? Why were not proper steps taken in the first place?

Major Baird: It has not been in existence; it is only just coming out.

SIR F. HALL: The present one.

Major Baird: What has been discovered is that khaki is not liked by sailors, and it is having a bad effect on the *esprit de corps* and *moral* to put them into khaki. That is the plain fact, and as we can both please the sailors and soldiers without any increased cost to the State, certainly it is worth while doing so.

Colonel Yate: Knowing how all commanding officers are anxious to see all their men in up-to-date uniform, will the hon. and gallant gentleman give special instructions that no officer is compelled to purchase a new uniform until the old uniform is worn out?

Major Baird: I have already said that.

No Chevrons for the R.A.F.

CAPTAIN GANZONI on July 15th asked the Under-Secretary of State to the Air Ministry whether he is aware that a recent Order forbids the wearing of service chevrons by officers and men of the Royal Air Force; whether any reason can be given for this decision; whether he will explain why this differentiation has been made in practice between the Royal Air Force and the two senior Services; and, if the new Order must be adhered to, will any Service distinction be devised entirely suited to the conditions prevailing in the Royal Air Force?

The Under-Secretary of State to the Air Ministry (Major Baird): The question of wearing service chevrons was very carefully considered by the Air Council, and it was decided that they should not be allowed, as in the Royal Air Force the general conditions are such that service abroad need not involve more risk and discomfort than service at home. As my hon. and gallant friend is aware, pilots and observers wear distinctive badges, and will continue to do so.

Assistance for Flax Companies.

THE Flax Companies (Financial Assistance) Bill was considered in Committee in the House of Commons on July 9th.

Mr. Sherwell moved as an amendment restricting to persons "carrying on a bank or other institution which has for its principal object the lending of money" the authority given by the Bill to render financial aid.

Mr. Forster, Financial Secretary to the War Office, said he was unable to accept the amendment. Its adoption would prevent those engaged in the linen industry taking part in operations in which they were anxious to engage. Owing to the present shortage in supplies of material, the linen industry had to look forward to a prospect in the next twelve months of standing machinery and severe unemployment, and these conditions those concerned were anxious to avoid in the interests of the workpeople, the shareholders, and the country. In order to keep the machinery of the linen industry running it would be necessary to treble the production of flax in the United Kingdom. To accomplish that would take a considerable time, but there was no time to lose in setting about the business.

SIR C. HOBHOUSE was afraid there was a danger that the grower of flax might be tied to the person who made use of his produce.

Mr. Forster said the amendments he proposed to move were simple. One would make it clear that the consent of the Board of Trade was necessary before any company or others could exercise powers under the Bill; another made it plain that Treasury sanction was necessary before new capital could be raised; the third amendment adopted Mr. Holt's proposal that the power to borrow money should not operate so as to increase the total amount which the company or association was authorised to borrow.

Mr. Sherwell withdrew his amendment, and Clause 1 was agreed to with Mr. Forster's amendments.

The Bill passed through Committee, and was read the third time and passed.

THE ROYAL AIR FORCE

London Gazette, July 9th.

The following temp. appointments are made at the Air Ministry:—
Staff Officers, 1st Class.—Capt. (Temp. Maj.) C. A. J. Butter, and to be Temp. Lieut.-Col. whilst so employed, vice Lieut.-Col. R. C. Donaldson-Hudson, D.S.O.; June 19th. T. B. Wood, C.M.G. (Col. in Army), and is granted a temp. commn. as Lieut.-Col. (Hon. Col.); June 22nd.

Staff Officer, 2nd Class.—And to be Temp. Maj. whilst so employed if not already holding that rank:—Maj. G. P. Myers; April 1st.

H. E. Rudkin (Maj., R. Ir. R.), and is granted a temp. commn. as Maj., vice Capt. T. F. G. Strubell; June 26th. (P.) Capt. (Temp. Maj.) R. S. Lindsell, Lieut. (Temp. Capt.) J. E. B. Thornely; June 25th.

Staff Officers, 3rd Class.—Lieut. R. E. Johnson, vice Lieut. (Temp. Maj.) J. E. B. Thornely; June 25th. Lieut. H. J. Eller, and to be Temp. Capt. whilst so employed; June 10th.

The following temporary appointments are made:—

Group Commander.—Lieut.-Col. (Temp. Brig.-Gen.) H. P. Smyth-Osbourne and to retain his rank whilst so employed; July 3rd.

Colonel (Equipment).—Maj. (Temp. Lieut.-Col.) R. H. Austin-Sparks, and to be Temp. Col. whilst so employed; July 3rd.

Staff Officers, 1st Class.—And to be Temp. Lieut.-Cols. whilst so employed, if not already holding that rank:—(Air) Capt. (Temp. Maj.) G. M. G. Visct. Maidstone; April 15th. Maj. (Temp. Lieut.-Col.) Hon. J. D. Boyle, D.S.O.; April 18th. Maj. H. A. R. Aubrey, M.C.; May 5th.

Staff Officers, 2nd Class.—H. Campbell, D.S.O. (Lieut.-Col. in Army, T.F.), and is granted a temp. commn. as Lieut.-Col.; April 1st (substituted for notification in *Gazette* May 3rd); E. W. Simpson (Capt., Arg. and Suth'd. Highrs., T.F.), and is granted a temp. commn. as Capt., and to be Temp. Maj. whilst so employed; April 11th (substituted for notification in *Gazette* May 3rd).

Staff Officers, 3rd Class.—Capt. H. de B. C. Garfit; May 11th. (P.) Lieut. A. H. Goldie, and to be Temp. Capt. whilst so employed; May 16th. (Q.) Lieut. (Temp. Capt.) F. W. Angus, and to retain his temp. rank whilst so employed; May 1st.

Flying Branch.

Lieuts. to be Temp. Capts. whilst employed as Capts. (A. and S.):—E. C. Johnson; June 16th. J. I. T. Jones; June 19th. B. C. Jones; June 20th. (Hon. Capt.) H. R. de Wilde; June 30th. J. A. Craig, W. C. Gardiner, H. A. Oakes; July 1st.

Lieut. (Temp. Capt.) C. A. Stevens, M.C., relinquishes the appointment of S.O. 3, and retains his temp. rank whilst employed as Capt. (A. and S.); May 27th.

Lieut. (Hon. Capt.) F. R. Sadd to be Temp. Capt. whilst employed as Capt. (K.B.); April 1st.

H. E. Johnston (Lieut., British Columbia R., C.E.F.) is granted a temp. commn. as Sec. Lieut. (A. and S.), and to be Hon. Lieut.; April 24th.

A. L. Coulson (Prob. Flight Officer, late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A. and S.); May 29th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A. and S.):—B. S. Case; May 24th. S. C. McLeod; May 27th. A. G. Longson; May 29th. L. W. Thres; May 30th. P. F. Mitchell, N. S. Muir, O. T. Lashmore, W. Geary; May 31st. H. L. Prime; June 2nd. F. E. Watts; June 3rd. O. G. Gregson, J. T. Aitken, E. A. R. Lee, A. W. Fisher, P. L. Watney; June 4th. A. V. Cosgrove, F. W. Cannon, H. Walker; June 6th. G. H. Pitt, F. W. Jones, H. A. Morley, H. W. F. Rendall; June 7th. G. E. Stevens, B. G. Lees, J. J. Freestone; June 8th. C. R. Plant; June 9th. E. H. Searle; June 11th. R. A. H. Lloyd, T. C. Herman, N. F. Bishop; June 12th. L. H. T. Ashburner, G. J. Farnworth, O. M. Smith, W. Cox; June 13th. A. S. G. Rodway; June 14th. H. E. Warner; June 20th.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (Observer Officers):—F. A. Lewis, N. M. Dales, T. S. Chilton, L. R. P. Backhouse, A. Lowe; June 12th. W. H. Bentley, B. Hurdus; June 21st. W. W. Hewitt, W. Forbes; June 23rd. H. C. J. Routledge, E. S. Coombes, R. Carnie; June 24th. E. H. Cooke, F. R. Oddy; June 29th.

The following are granted temp. commns. as Sec. Lieuts. (Observer Officers):—J. W. Lunn (Lieut., Highland Cyc. Bn., T.F.), and to be Hon. Lieut.; J. Rudkin (Temp. Sec. Lieut., Res. R. of Cav.); W. Tinsley (Sec. Lieut., Lond. R., T.F.); H. R. Goss (Temp. Sec. Lieut., E. York. R.); H. E. Hinchliffe (Temp. Sec. Lieut., Manch. R.); G. T. Gauntlett (Temp. Sec. Lieut., R. War. R.); B. H. Smyth (Sec. Lieut., Glouc. R., S.R.); H. F. Weet (Sec. Lieut., Lond. R., T.F.); June 12th. R. J. Hunt (Lieut., Lond. R., T.F.), and to be Hon. Lieut.; June 21st. C. G. Stanley (Temp. Sec. Lieut., R. War. R.); E. L. Ward, M.C. (Temp. Lieut., R. War. R.), and to be Hon. Lieut.; June 27th. W. P. Cooper (Sec. Lieut., W. York. R., T.F.); E. F. V. Chard (Sec. Lieut., Lond. R., T.F.); J. Collier (Sec. Lieut., N. Lan. R., T.F.); J. C. Clark (Sec. Lieut., Suff. R., T.F.); W. C. Day, M.C. (Lieut. Midd'x. R., T.F.), and to be Hon. Lieut.; J. D. Dick (Temp. Sec. Lieut., S. Wales Bord.); G. W. L. Day (Lieut., R.E.), and to be Hon. Lieut. R. Galloway (Sec. Lieut., Sco. Rif., S.R.); C. A. Lucy (Temp. Sec. Lieut., attd. R. Fus.); H. L. Macdonald (Temp. Sec. Lieut., R. Highrs.); D. A. Mackenzie (Lieut., C.F.A., C.E.F.) and to be Hon. Lieut.; D. S. Robertson, M.C. (Lieut., S. Lan. R., T.F.), and to be Hon. Lieut.; B. Reading (Temp. Sec. Lieut., York R.); G. E. Rolleston (Sec. Lieut., Leic. R., T.F.); W. V. Hunt (Temp. Sec. Lieut., M.G.C.); June 29th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (Observer Officers):—G. T. Campbell; June 22nd. A. Randall, E. H. Clayton, K. J. W. Dennitts, N. F. Frome, T. S. E. Whittaker, E. M. Whithan, L. McCall, D. A. Watson, S. G. Watson, J. A. L. Rogers, J. E. Elliott, H. A. Record, M. W. Wakeman, R. F. G. Band, V. Lockey, C. E. Richardson, O. Plant, A. E. Jenkins, G. G. Gilby, F. C. Phillips, H. S. Howard, J. K. Holdsworth, A. Berry, J. C. Ferguson, A. N. C. Breingan, G. G. Shaw, H. Speed, T. E. T. K. Green, R. H. B. Greenyer, B. G. Stubbs, A. H. E. King, H. Faulks; July 6th.

The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (K.B.):—G. L. Barrett; June 10th. W. G. Piper; June 17th.

The notification in *Gazette* June 28th regarding Sec. Lieut. R. A. Arnott is hereby cancelled.

The notification in *Gazette* May 17th regarding R. A. Hodgson is cancelled, as he retains the rank of Lieut.

Lieut. A. R. Croker (Lieut., R.E., T.F.) relinquishes his commn. on ceasing to be employed; May 7th.

Capt. W. H. Gilroy relinquishes his commn. on account of ill-health; July 10th.

Capt. G. A. Thompson resigns his commn. and is granted the hon. rank of Capt.; July 10th.

The following Lieuts. resign their commns. to resume their medical studies and are granted the hon. rank of Lieut.:—R. B. Salisbury, K. Y. Sinclair; July 10th.

Lieut. D. C. Russell relinquishes his commn. on account of ill-health, and is granted the hon. rank of Lieut.; July 10th.

Lieut. D. H. Simmons relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; July 10th.

Lieut. W. J. H. Morgan resigns his commn.; July 10th.

Administrative Branch.

Lieuts. to be Temp. Capts. while employed as Capts.—G. S. D. M. Pape (from K.B.), T. D. S. Purdy; June 24th.

D. A. G. Dallas (Capt., Ind. Army) is granted a temp. commn. as Lieut., and to be Hon. Capt.; June 10th.

Sec. Lieuts. (Tech.) to be Temp. Lieuts. while employed as Lieuts.:—G. Weaver; May 11th. J. Black; June 29th.

Lieut. (Hon. Capt.) C. J. Pyke to be Lieut. (From Dir.); June 25th.

Lieut. (Hon. Capt.) P. Bewsher, D.S.C., to be Lieut. (from O.); July 1st.

Lieuts. (K.B.) to be Lieuts.:—D. S. Gray; June 28th. H. W. Bower; July 6th.

The date of appointment to a temp. commn. as Sec. Lieut. of A. R. Fulton is April 1st and not as in the *Gazette* of May 21st.

The following are granted temp. commns. as Sec. Lieuts.:—F. Grave Or. Mr. and Hon. Capt., Lond. R., T.F.), and to be Hon. Capt.; May 1st. R. M. Ferguson, S. L. Smith; July 5th. C. J. Beardow, E. J. K. Boden, C. F. Kavanagh, W. Muir; July 6th. G. Probert, H. G. Bill, W. Blakemore, S. F. Black, H. E. Brain, F. G. Brooker, G. W. U. Clissold, E. W. Deane, G. Dunn, H. E. Fenton, L. J. Ford, C. W. Garrod, E. B. Hodgkinson, P. S. Howard, E. W. Husband, A. H. V. Kingdon, S. E. Knight, R. W. Letchford, W. J. Meager, F. J. Nicholson, J. Norman, S. H. Peach, S. T. Phillips, S. T. Pye, J. W. Savage, L. H. Simmons, H. L. Smith, L. J. Sterlini, F. G. Thompson, R. F. Tunmer, P. K. Whitehead; July 8th. E. J. H. Bluet (substituted for notification in *Gazette* June 25th). E. B. Roscoe, H. G. Cogle; July 10th.

The appointment of E. A. Berry to be Sec. Lieut., notified in *Gazette* of May 14th, is antedated to April 14th.

Capt. R. D. Bartlett (Lieut., R.N.V.R.) relinquishes his commn. on ceasing to be employed; May 8th.

Sec. Lieut. H. M. Donald is dismissed the service by sentence of a General Court-Martial; June 14th.

Sec. Lieut. A. W. Buchan resigns his commn. to resume his medical studies, and is granted the hon. rank of Sec. Lieut.; July 10th.

The following Sec. Lieuts. resign their commns. and are granted the hon. rank of Sec. Lieut.:—W. S. Dickson, E. McN. Hepburn, J. Kelly, J. McAllister; July 10th.

The following Sec. Lieuts. resign their commns.:—J. E. Broadhead, F. Drake, J. A. Haywood, S. A. Pook, T. Rivers-Fry, C. M. Stone; July 10th.

Technical Branch.

A. Belton (Capt., R. Fus., S.R.) is granted a temp. commn. as Capt., and to be Temp. Maj. while specially employed; April 1st.

Capt. (Temp. Maj.) J. B. Vernon retains his temp. rank while employed as Maj. (from Admin.); May 8th.

Lieut. (Temp. Capt.) G. E. Hervey, D.S.C., to be Temp. Maj. while employed, as Maj. (from A. and S.); July 1st.

Lieuts. to be Temp. Capts. while employed as Capts.:—J. A. P. Martin, A. V. Shewell, J. H. Turner; April 1st. G. F. Drudge; June 27th. R. M. Baird; June 29th. E. Pimley; July 3rd.

Capt. (Temp. Maj.) A. E. Oxley relinquishes the temp. rank of Maj. on appointment as Capt. (Tech.); May 20th. (Substituted for notification in *Gazette* June 4th.)

H. G. Thomas (Temp. Lieut., R.E.) is granted a temp. commn. as Lieut., and to be Temp. Capt. while specially employed; April 1st.

H. V. Snook (Temp. Sec. Lieut., R.E.) is granted a temp. commn. as Lieut.; May 24th.

Sec. Lieuts. (Hon. Lieuts.) to be Temp. Lieuts.:—P. Jeffrey; April 1st. V. A. Cooper, G. H. Crick, L. J. C. Lord, H. G. Wood; June 15th. A. C. H. Dashwood, W. L. Lancaster; June 16th. H. Allsebrook, F. C. Butler, D. R. Mitchell; June 21st.

Sec. Lieuts. to be Temp. Lieuts.:—W. G. Barnes (from Admin.); April 1st. J. E. H. Swain; June 15th. W. Allan, F. R. Goodwin, B. Rotherham; June 21st. (Hon. Capt.) C. C. Gilbert; June 27th. Lieut. G. C. Heseltime (from A. and S.) to be Temp. Lieut.; May 22nd.

Sec. Lieuts. (Admin.) to be Sec. Lieuts.:—W. L. Eveleigh, A. K. Murray; May 16th. H. V. Bullock; May 29th. B. F. T. Hare; June 1st. C. Marley, W. S. Sholl; June 22nd. A. F. Wilson; July 1st.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts.:—H. J. Amery; April 1st. P. S. Beaufort; June 18th.

J. C. Harrison (Capt., Lond. R., T.F.) is granted a temp. commn. as Sec. Lieut., and to be Hon. Capt.; June 18th.

J. Wilson is granted a temp. commn. as Sec. Lieut.; July 6th.

T. J. Fazackerley (Temp. Lieut., R.W. Fus.) is granted a temp. commn. as Sec. Lieut., and to be Hon. Lieut.; April 22nd. (Substituted for notice in the *Gazette* of May 24th.)

Capt. (Temp. Maj.) C. J. Price resigns his commn., and is granted the hon. rank of Maj.; July 1st.

Medical Branch.

The following are granted temp. commns. as Lieuts.:—A. K. Soutar; July 6th. F. H. Wallace; July 8th.

Memoranda.—Capt. M. Heckstall-Smith to be Temp. Maj. whilst specially employed; June 19th.

Lieut. (Temp. Capt.) J. A. Carr, D.S.C., reverts to Lieut. (Hon. Capt.) on ceasing to be employed as S.O., 3rd Cl.; June 15th.

The notification in *Gazette*, June 7th, regarding Sec. Lieut. A. R. Fulton is cancelled.

The appointment of the following officers to the Royal Air Force is cancelled:—Engr. Lieut.-Com. T. Carr (R.N.). Lieut.-Coms. (R.N.V.R.):—A. S. Langley, J. E. Coates, J. A. Williams, T. S. Price, Lieuts. (R.N.V.E.):—H. G. L. de Whalley, S. H. Brazier, C. H. Swann, J. C. Mottram, F. C. Archer, J. Lilburn, G. H. Hannay, G. S. Hewett, S. J. Green, B. Turner, J. L. Potts (S.-Lieut., R.N.V.R.), C. V. Ingram (A./Pr. R.N.R.), R. J. M. Sennitt (W.O.).

London Gazette, July 13th.

The following temporary appointments are made:—

Staff Officers, 1st Class.—(Air)—Capt. D. Iron, and to be Temp. Lieut.-Col. while so employed; April 1st.

Staff Officers, 2nd Class.—And to be Temp. Majs. while so employed if not already holding that rank (Air):—Lieut. (Temp. Capt.) W. H. S. Garnett; April 26th. Capt. C. S. McNab; June 29th. (P.)—Lieut. (Temp. Capt.) R. L. Kennedy; June 2nd.

Staff Officers, 3rd Class.—Lieut. (Temp. Capt.) G. C. Gold (from S.O. 3 Air Ministry), and to retain his temp. rank while so employed; June 8th. J. W. Aldridge (late Temp. Maj. in Army), and is granted a temp. commn. as Capt.,

July 10th. (P.)—The rank and name of Lieut. (Temp. Capt.) S. J. Smith are as now described, and not as stated in *Gazette* July 2nd.

Flying Branch.

Lieuts. (Temp. Capts.) to be Temp. Majors, while employed as Majors. (A. and S.):—J. Forgan-Potts, C. H. Hayward; July 8th. M. R. Buckland, C. P. O. Bartlett, D.S.C.; July 12th. I. N. C. Clark, D.S.C.; July 18th. Lieuts. to be Temp. Captains, while employed as Captains. (A. and S.):—E. L. Crowe, H. Kirby; April 2nd. T. C. Creaghan, J. L. M. de C. Hughes-Chamberlain, G. N. Moore, C. W. Odell; May 21st. (Hon. Maj.) H. A. C. Wright; May 18th. H. V. Robbins, M.C.; May 21st. G. H. Armstrong, V. P. Cronyn, F. G. Garratt, R. H. S. Hunter, R. C. Kean, F. F. H. E. Kolligs, E. H. Marshall, M. M. Sisley; June 1st. J. D. Canning; June 27th. C. O. Bean, J. W. Baker, L. M. Copeland, W. F. Findlay, J. Harper, P. W. B. Lawrance, R. G. Malcolm, M.C., P. L. Plant, J. Potter, H. Puckle, N. L. Robertson, D. A. A. Shepperson, H. Slingsby; July 1st. W. E. Green, C. Parry, H. N. Lett; July 2nd. W. H. Farrow, L. H. Short; July 3rd. S. P. Ball, M. Ballard, J. A. W. Binnie, L. G. Brazier, T. B. Bruce, W. R. Balden, E. S. T. Cole, C. Crawford, T. Hayes, W. J. Henney, L. M. Isitt, W. R. Jones, J. G. Kingsbury, P. J. Long, J. Parry, S. J. Stewart, B. V. S. Smith, M.C., O. H. D. Vickers, A. C. Wyness, F. C. A. Wright, W. Wigg, H. M. Yeatman; July 6th. Lieuts. (Hon. Capts.) to be Temp. Captains, whilst employed as Captains. (A. and S.):—S. R. Watkins; May 8th. G. W. Henning; June 6th. G. Broadner, E. R. Pritchard, T. G. C. Wood, D.S.C.; July 1st. E. W. Broadberry, M.C., W. W. Leek, C. L. Philcox, C. B. Wainwright; July 6th. G. A. Gooderham, G. H. D. Gossip, J. A. Shaw, A. T. Sketchley, A. J. B. Tonks, C. R. Vaughan, A. G. Woodward; July 8th. Lieut. (Temp. Capt.) H. S. Paynter retains his temp. rank whilst employed as Capt. (A. and S.) (from Ad.); July 5th. Lieut. H. A. Edridge-Green to be Lieut. (Dir.) from (Ad.); July 4th. Lieuts., Observer Officers, to be Lieuts. (A. and S.):—June 12th.—J. W. D. Melhuish, M.C., R. S. B. Beckett (Temp. Capt.) T. Edwards, and to be Hon. Capt. Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (A. and S.):—M. L. Dunham; April 27th. U. T. McDonald; April 30th. C. R. Fraser; June 1st. G. H. Enderby, G. E. Dunn; June 2nd. J. J. Elder; June 4th. H. P. Robinson; June 9th. C. H. Reay; June 10th. W. Whatmore, A. E. Sharp, H. Hartley, J. Macintyre, J. V. Lewis, H. J. Smith; June 11th. L. Duncombe, T. McCarthy, D. J. Taring, F. J. Belley, C. C. A. Daniel, L. C. Ellis, R. C. Hardy; June 12th. D. L. Little, C. E. Smith, S. E. Kilbey, K. McC. Dolbey, O. P. Gosling, W. H. Mitchell, R. W. Davis, G. P. Dymond, C. E. Howley, J. G. Kenyon, W. L. Chapman, W. F. Bates, J. G. Dennis, C. N. Prentice, A. T. Guy, J. N. Norman; June 13th. N. M. McDougall, G. Lyles, W. H. Clarkson, G. Muir, D. A. Newson, J. C. Garlake, R. Tickle, A. G. Hill, H. M. Towson, D. J. Wilks, F. L. W. Dowling, E. R. N. Main, N. H. Bain, J. Town, F. A. Lygo, S. A. Dismore, R. Smith (date of 1st Commn., Aug. 12th, 1917), S. N. Jacobson, C. N. Drew, C. H. Howitt, J. Baillie, C. L. Stewart, H. S. R. Burt, A. D. Kiernander, T. R. Michelson, J. Sewell, W. C. Marsh, J. A. Seldon, W. Ling, W. Knight, F. M. Honore, H. R. Vennard, J. Harston; June 14th. The following are granted temp. commns. as Sec. Lieuts. (A. and S.):—A. S. Wright (Temp. Sec. Lieut., attd. Essex R.), A. L. Tupman (Sec. Lieut., Notts. and Derby R.); June 11th. J. L. Graham (Sec. Lieut., R. Scots, T.F.), G. W. E. Whitehead, (Lieut., R.F.A.) and to be Hon. Lieut.; June 12th. E. W. Cowdery (Sec. Lieut., R.F.A., S.R.), C. L. Childs (Lieut., Bord. R., T.F.) and to be Hon. Lieut., H. G. Garrett (Temp. Sec. Lieut., attd. K.R. Rif. C.); June 13th. C. B. Wilson (Sec. Lieut., Lan. Fus., T.F.), E. L. Wilson (Sec. Lieut., Manch. R., T.F.), H. L. Jackson (Temp. Lieut., K.O. Malta R.), and to be Hon. Lieut., W. L. F. Nuttall (Temp. Sec. Lieut., Labour Corps), P. E. Bishop (Capt., Can. A.P.C., C.E.F.), and to be hon. Capt., W. Cameron (Temp. Sec. Lieut., North'd. Fus.), H. C. Heintzman (Lieut., Can. F.A., C.E.F.), and to be Hon. Lieut.; A. C. Cook (Lieut., Durh. L.I., T.F.), and to be hon. Lieut., E. Turnbull (Lieut., R.F.A., S.R.), and to be hon. Lieut.; June 14th. D. H. O. Edmunds; June 17th. H. Terrell (late Lieut., Ind. Army), and to be hon. Lieut.; July 9th. Flight Cadets granted temp. commns. as Sec. Lieuts. (A. and S.):—C. Dotzert; June 3rd. S. McKeever; June 4th. R. J. D. S. Straw; June 5th. N. R. E. Mattingly; June 7th. Sec. Lieuts. (late Gen. List, R.F.C., on prob.) confirmed in their rank as Sec. Lieuts. (Observer Officers):—H. J. Tinker; June 25th. W. H. Holton; June 26th. S. O. Franks, R. E. Linder; July 6th. The following are granted temp. commns. as Sec. Lieuts. (Observer Officers):—Flight Cadet W. H. Currie; May 18th. G. L. Warner (Lieut., Quebec R., C.E.F.), and to be hon. Lieut.; June 22nd. H. Walpole (Sec. Lieut., Notts. and Derby R., T.F.); June 25th. A. Callender (Temp. Sec. Lieut., attd. Midd'x R.); June 30th. S. T. Goodman, M.C., D.C.M. (T/Sec. Lieut., R. Fus.), H. L. Williams (T/Sec. Lieut. R. W. Fus.), J. H. Crowe (T/Sec. Lieut., S. Staff. R.); July 6th. Following prob. Observer Officers (late R.N.A.S.) granted temp. commns. as Sec. Lieuts. (Observer Officers):—R. H. S. Calver, F. J. Hopwood, F. G. Porter, R. C. Emmett, W. J. Ward, H. Saunders, L. G. Cathrall; June 4th. Following are granted temp. commns. as Sec. Lieuts. (K.B.):—L. A. Sterling, M.C. (Lieut., R.F.A., S.R.) and to be hon. Lieut., J. McGilchrist (Sec. Lieut., R.G.A., S.R.); June 12th. Lieut. F. J. B. de Sales La Terriere (Lieut., Lancers) relinquishes his commn. on ceasing to be employed; June 22nd. The initials of Sec. Lieut. A. J. Macqueen are as now described, and not as in the *Gazette* of July 5th. Following Sec. Lieuts. relinquish their commns., having been found permanently unfit as Pilots or Observers:—E. W. Royce-Reddall, G. H. Brown, P. Collinson, J. A. Biddle, G. Paterson, C. J. Hooley, J. B. Bonser, F. Steel, A. C. Cash, S. Bowden, T. Bailes, R. S. Fitch, F. G. M. Stennett, F. H. K. Pearson, S. Bennett, P. R. Paul, A. Purdy, F. Hargraves, O. H. Basher, H. V. Whitaker, J. Murphy, J. W. Waterworth, D. W. S. Waite, A. Faggins, R. A. Loader, J. M. Waterson, J. A. Herrara, F. F. Archer, H. H. Beeby, F. W. Smith, C. H. Ashworth, F. J. L. Bishop, W. E. Weeks; July 13th. Capt. W. C. Ault relinquishes his commn. on account of ill-health, and is granted the hon. rank of Capt.; July 13th. Lieut. G. F. Hubbard relinquishes his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Lieut.; July 13th. Lieut. S. Pickford relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; July 13th. Lieut. A. A. J. Quennell resigns his commn.; July 13th. Lieut. H. R. Large relinquishes his commn. on account of ill-health, and is granted the hon. rank of Lieut.; July 13th.

Administrative Branch.

Lieuts. (Temp. Capts.) to be Temp. Majors, whilst employed as Majors. (A. and S.):—J. E. Yeomans; July 1st. Lieuts. to be Temp. Captains, whilst employed as Captains. (A. and S.):—J. E. Catherall, K. A. Meek; April 1st. C. H. Cocup; April 4th. H. E. Tee; April 7th. H. C. Pyper; May 25th. Sec. Lieuts. to be Temp. Captains, whilst employed as Captains. (A. and S.):—F. C. Payne; April 3rd. (Hon. Lieut.) F. C. Staines; April 19th.

The following are granted temp. commns. as Lieuts.:—J. S. Bowler (Temp. Lieut., A.P.D.), W. C. Croydon (Temp. Lieut., A.P.D.); April 1st. E. Colman-Brown (Temp. Lieut., K. African Rifles); June 10th. S. J. Martin (late Lieut.,

R. Defence C.); July 8th. Sec. Lieuts. to be Temp. Lieuts. while employed as Lieuts.:—G. L. Bennet; June 22nd. (Hon. Lieut.) L. M. T. Griffin; June 24th. M. M. Merriman; July 5th. Lieuts. (O.) to be Lieuts.:—A. W. C. Cartwright; April 1st. W. D. Lauder, M.C.; July 3rd. The following are granted temp. commns. as Sec. Lieuts.:—J. C. Macdonald; April 8th. C. H. Marston; April 15th. E. Sparshott; June 7th. A. Chouffot, F. Wheatcroft, E. Roebuck, C. P. Brown, J. E. Sankey, J. T. Brunwell, C. Capel, L. T. Holmes, F. G. Lait, J. S. McLeod, R. D. Ogden, H. E. G. Richards, H. B. Smith, J. C. Sword, G. M. Washbourne, W. R. Watt, W. E. Garden, E. J. Gordon, R. G. Hollway, E. Holt, H. M. Lonsdale, J. Mellor, C. G. A. Poole, A. K. Spens, W. E. E. Stephens, J. R. Turner, C. W. Wheeler, R. C. R. Wilde; July 3rd. G. S. Crowther, F. Weekes; July 8th. G. K. Austin, G. T. Clarkson, H. G. Cogle, W. C. Faulkner, H. H. Peppercorn, E. B. Roscoe; July 10th. The date of appointment of Sec. Lieut. H. R. White is July 8th, and not as in the *Gazette* of June 25th. Sec. Lieut. A. McC. Goddard (late Gen. List, R.F.C., on pros.) is confirmed in his rank as Sec. Lieut.; April 26th. Notification regarding H. Willis in *Gazette* of June 25th is cancelled. The date of appointment of Sec. Lieut. F. C. Payne is April 2nd, and not as in the *Gazette* of May 17th; Sec. Lieut. R. W. Boyce relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lieut.; July 13th. Sec. Lieut. E. B. Cogswell relinquishes his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Sec. Lieut.; July 13th. The following Sec. Lieuts. resign their commns.:—J. W. V. Alstyne, W. H. Southwood; July 13th.

Technical Branch.

Capt. (Temp. Maj.) G. Stevens retains his temp. rank while employed as Maj.; May 21st. Lieut. H. J. Poole to be Temp. Capt. while employed as Capt.; May 29th. Sec. Lieuts. to be Temp. Captains, while employed as Captains:—F. E. Cooper, R. G. Whitcombe; June 27th. C. Shears; July 1st. Lieut. (Temp. Capt.) F. C. Mears to be Capt. (from K.B.); June 7th. Capt. A. H. Binyon to be Capt. (from Ad.); June 24th. Sec. Lieut. (Hon. Lieut.) J. A. Pritchard to be Temp. Lieut. while employed as Lieut.; April 2nd. Lieut. K. L. Williams to be Lieut. (from A. and S.); June 24th. Lieuts. (A. and S.) to be Sec. Lieuts. and to be Hon. Lieuts.:—J. E. Jones; April 9th. W. H. Jones; June 20th. Sec. Lieut. F. N. Lynch-White (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut.; May 17th. Lieut. L. Collier from (O.) to be Sec. Lieut. and to be Hon. Lieut.; May 5th. W. H. S. Elliott is granted a temp. commn. as Sec. Lieut.; July 10th. Sec. Lieut. A. W. Hemphill (Lieut., R.F.A., S.R.) relinquishes his commn. on ceasing to be employed; June 22nd. Capt. (Temp. Maj.) W. C. Power resigns his commn., and is granted the hon. rank of Maj.; July 13th.

Medical Branch.

A. Paling is granted a temp. commn. as Maj.; July 12th. D. Guthrie is granted a temp. commn. as Capt.; May 1st. The following are granted temp. commns. as Lieuts.:—E. L. Bunting, A. Read; July 10th. Memoranda.—Lieut. (Temp. Maj.) J. E. L. Wrench, C.M.G., relinquishes the appointment of S.O., 2nd Cl., at Air Ministry, but to retain his temp. rank while spec. employed; May 14th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, July 3rd.

Special Appointments.

(Graded as Staff Captains, while employed as Sqdn. Comms., R.F.C., Cdt. Wing).—Oct. 8th, 1917.—Capt. W. R. Hoare, Hamps. R. (T.F.), and to be secd.: Temp. Capt. H. W. R. Haselhurst, attd. North'd. Fus., and to be transfd. to R.F.C. Gen. List. (Substituted for notification in *Gazette* March 11th, under "Royal Flying Corps, Mil. Wing.")

The following appointments are made:—**Flying Officers.**—Temp. Sec. Lieuts. (on prob.) Gen. List, and to be confirmed in their rank:—J. W. Potts; Oct. 19th, 1917. C. de Vitalis; Dec. 21st, 1917. J. Hart; Feb. 20th. R. H. Roantree; March 27th.

The initials of Temp. Sec. Lieut. N. D. Willis, Gen. List, are as now described, and not as in *Gazette* of Jan. 14th.

Squadron Officer (graded as an Equipment Officer, 3rd Class).—Temp. Sec. Lieut. (on prob.) A. E. Boyce, Gen. List, and to be confirmed in his rank; March 27th.

Equipment Officers, 3rd Class.—Temp. Sec. Lieuts. (on prob.) Gen. List, and to be confirmed in their rank:—M. Sheriff, D.C.M.; March 2nd. A. C. Smith; March 18th.

London Gazette Supplement, July 4th.

The following appointments are made:—**Flying Officers.**—Temp. Sec. Lieuts. (on prob.) Gen. List, and to be confirmed in their rank:—J. M. Vennell; Dec. 12th, 1917. D. G. Reid; Dec. 24th, 1917. W. G. Carmichael; Feb. 1st. W. A. Anderson; Feb. 20th. G. W. Welch; March 12th. N. V. Clarke; March 18th. R. R. Brown; March 20th. R. G. Martin; March 25th. J. Reid, F. W. Plaxton; March 28th. J. F. Slavik; March 30th.

General List.—Temp. Sec. Lieut. L. M. Hughes to be Temp. Lieut.; March 26th. 3rd Cl. Air Mech. T. Usher to be Temp. Sec. Lieut.; Dec. 28th, 1917. T. E. Snelgrove to be Temp. Sec. Lieut. (on prob.); March 22nd.

London Gazette Supplement, July 5th.

General List.—Cpl. W. J. Lee-Bird, from R.E. (T.F.), to be Temp. Sec. Lieut.; March 16th, 1916. Cadet L. P. J. Dion, from Canadian R., to be Temp. Sec. Lieut. (on prob.); March 21st.

London Gazette Supplement, July 6th.

The following appointment is made:—**Flying Officer.**—Temp. Sec. Lieut. (on prob.) W. J. Washer, Gen. List, and to be confirmed in his rank; Oct. 31st, 1917.

London Gazette Supplement, July 8th.

General List.—W. B. Middleton to be Temp. Sec. Lt. (on prob.); March 30th. London Gazette Supplement, July 9th.

Schools of Military Aeronautics.

Examining Officer (graded as an Equipment Officer, 1st Class).—Temp. Capt. F. H. Beer, Gen. List, from an Examining Officer (graded as a Flight Com.) March 1st.

General List.—Capt. G. L. Blaine, S. Afr. Inf., to be Temp. Capt.; Jan. 15th. To be Temp. Sec. Lieuts.:—Acting. Sgt. R. McL. Dunn, from R. Highrs.; Feb. 13th. Flt. Sgt. C. C. Gissing, from R.F.C.; Feb. 19th. Spr. R. E. Dimmick, from R.E.; March 2nd. Pte. A. G. Buff, from Norf. R.; Sgt. H. W. Petter, from R.A.; March 10th.

Aeronautical Inspection Department.

London Gazette Supplement, July 5th.

To be Temp. Hon. Lieuts.:—Whilst employed as Asst. Inspns., Aeronautical Inspn. Dept.:—W. E. Pickerill, W. B. Gibson; Oct. 1st, 1917.



The Looping Fatality at Brighton.

At the inquest at Brighton last week on Ralph Sinder, builders' foreman, who was killed on July 8th by a sandbag, which fell from a machine which was looping over the town, it was stated that the police had been unable to get any trace of

the pilot. The coroner said it did not seem to him that any military purpose could be served in "looping" over Brighton. Something should be done to stop the practice unless it was absolutely necessary for military reasons. The inquest was adjourned.

THE FLIGHT OF AN AEROPLANE AT DIFFERENT ALTITUDES.

By LOUIS DE BAZILLAC, Ingenieur (Ecole Supérieure d'Aéronautique de Paris).
Translated by B. BRUCE-WALKER, B.Sc.

(Continued from page 781.)

(a) By Reference to Resistances.

If it is granted, for want of exact experiments, that the thrust of the propeller is reduced proportionally to the density of the air, the general formulae for the aeroplane at an altitude

Z, defining the ratio $\mu = \frac{P}{P_0}$, are as follows:—

- (1) $H = \alpha \mu n^2 D^4$
- (2) $T = \beta \mu n^3 D^5$
- (3) $\gamma = \frac{V}{nD}$
- (4) $\alpha = f_1(\gamma)$
- (5) $\beta = f_2(\gamma)$
- (6) $W = K \gamma S \mu V^2$
- (7) $R = (K_x S + \lambda) \mu V^2$
- (8) $K_x = f_3(i)$
- (9) $K_\gamma = f_4(i)$

zero altitude and the altitude $Z = 60,370 \log \frac{1}{\mu}$ we have according to the above equations:—

$$(12) V = V_0 \frac{1}{\mu}.$$

The equations indicate further that for the same speed V the thrust of the screw H_0 at zero altitude and H at the altitude $Z = 60,370 \log \frac{1}{\mu}$ are connected by the equation:—

$$(13) H = H_0 \mu.$$

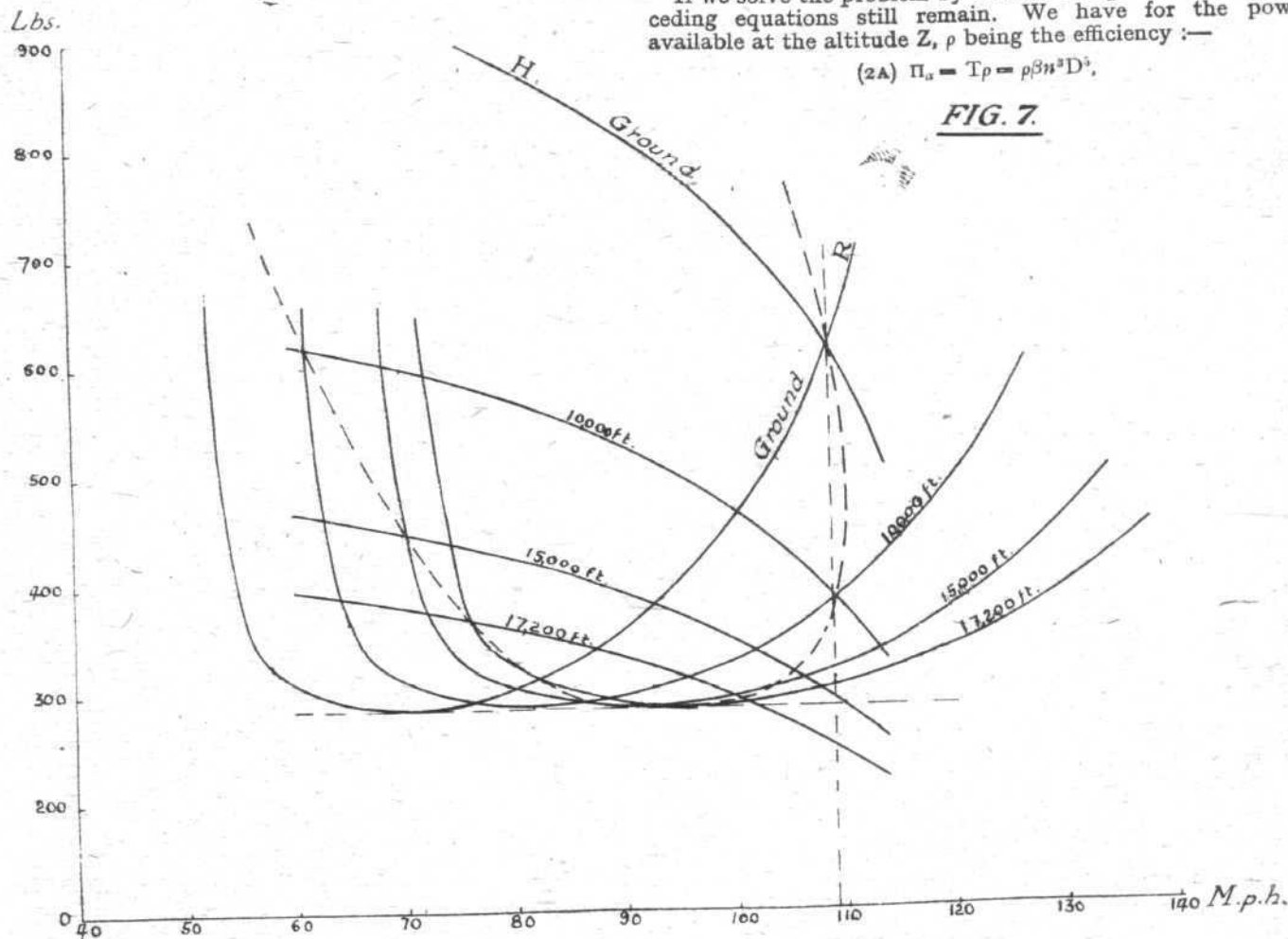
The relations (12) and (13) enable us, knowing $H = \phi_1(V)$ and $R = \phi_2(V)$, easily to construct a system of these curves for different particular values of μ .

(b) By Reference to Powers.

If we solve the problem by reference to powers all the preceding equations still remain. We have for the power available at the altitude Z, ρ being the efficiency:—

$$(2A) \Pi_a = T\rho = \rho \beta n^3 D^5.$$

FIG. 7.



and lastly, for horizontal flights at the altitude Z,

$$(10) H = R.$$

$$(11) Z = 60,370 \log \frac{1}{\mu}$$

The graphical solution of these equations is effected without difficulty by calculating first of all for $\mu = 1$:—

(1st) The different values of the thrust H of the propeller as a function of the speed of translation;

(2nd) The different values of the resistance to motion R of the aeroplane as a function of the speed of translation.

Construct (Fig. 7) the curves

$$H = \phi_1(V), \\ R = \phi_2(V),$$

for $\mu = \frac{P}{P_0} = 1$.

These curves will enable us to study the flight of the aeroplane near the ground, that is to say, at zero altitude.

If V_0 and V are the speeds giving the same resistance R for

for the power required

$$(7A) \Pi_r = RV = (K_x S + \lambda) \mu V^3,$$

and, lastly, for horizontal flight at altitude Z

$$(10A) \Pi_a = \Pi_r.$$

Construct the curves (Fig. 8):—

$$\Pi_a = \phi_1(V),$$

$$\text{and } \Pi_r = \phi_2(V),$$

for $\mu = 1$.

If V_0 and V are the speeds, and $(\Pi_r)_0$ and Π_r , the powers corresponding to the same angle of attack for zero altitude and the altitude $Z = 60,370 \log \frac{1}{\mu}$, we have according to the above equations:—

$$(12A) V^2 = V_0^2 \frac{1}{\mu};$$

$$(\Pi_r)^2 = (\Pi_r)_0^2 \frac{1}{\mu};$$

$$\frac{\Pi_r}{(\Pi_r)_0} = \frac{V}{V_0} = \frac{1}{\sqrt{\mu}}.$$

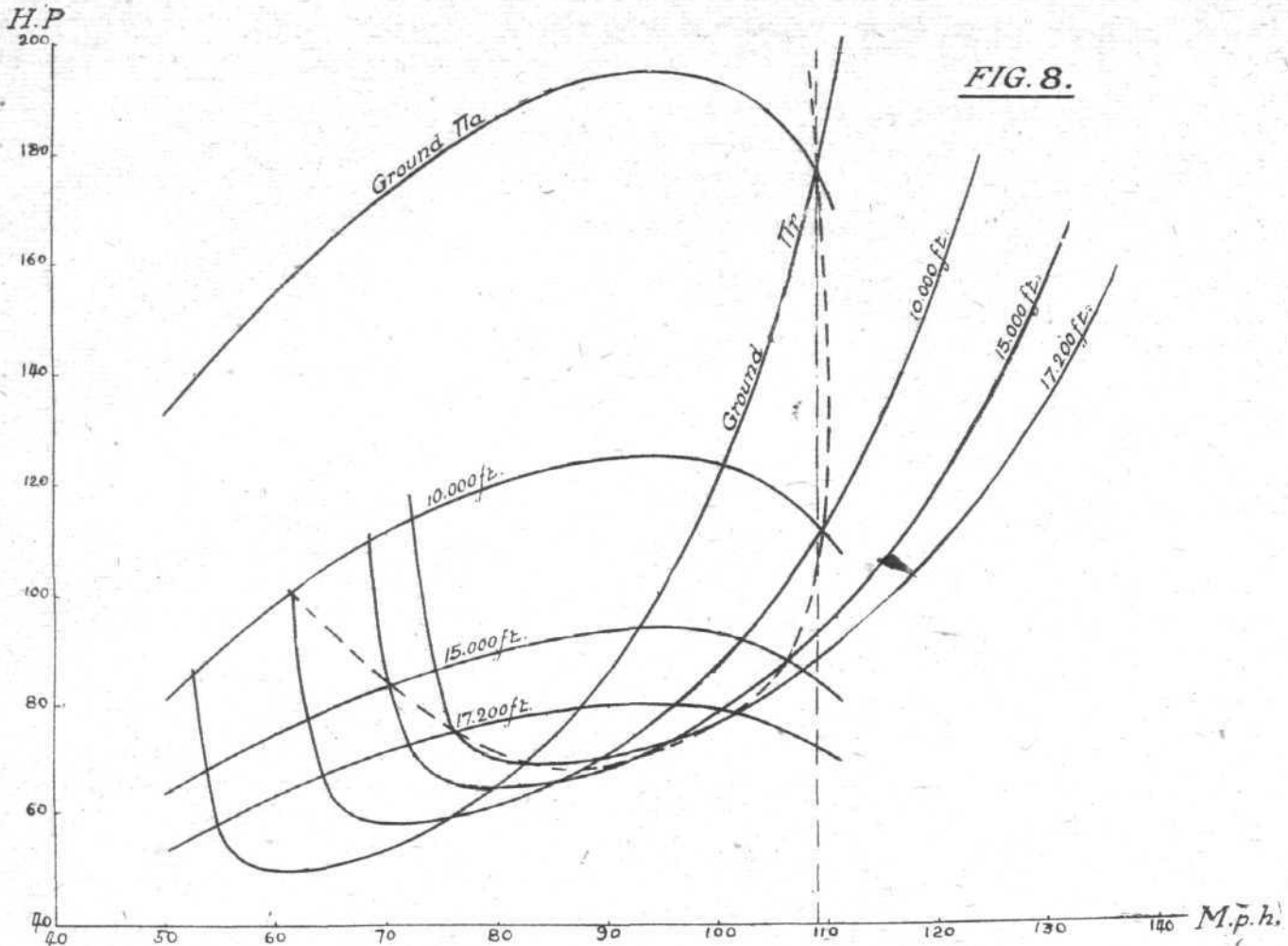


FIG. 8.

For the same [speed V the power available (Π_a) at zero altitude and Π_z at the altitude Z are connected by the equation:—

$$(13A) \Pi_z = (\Pi_a)_{\mu}.$$

The relations (12A) and (13A) enable us, knowing $\Pi_a = \phi_1(V)$ and $\Pi_z = \phi_2(V)$, to construct a system of these curves for different particular values of μ .

(c) Resistances per Unit Weight in Terms of the Angle of Attack

If, instead of expressing, as in the two preceding cases, the resistances and powers in terms of the speed, we express the resistance per unit weight in terms of the angle of attack, we may write, denoting by R_x and R_y the total drift and lift for unit speed,

$$R_x = K_x S + \lambda;$$

$$R_y = K_y S;$$

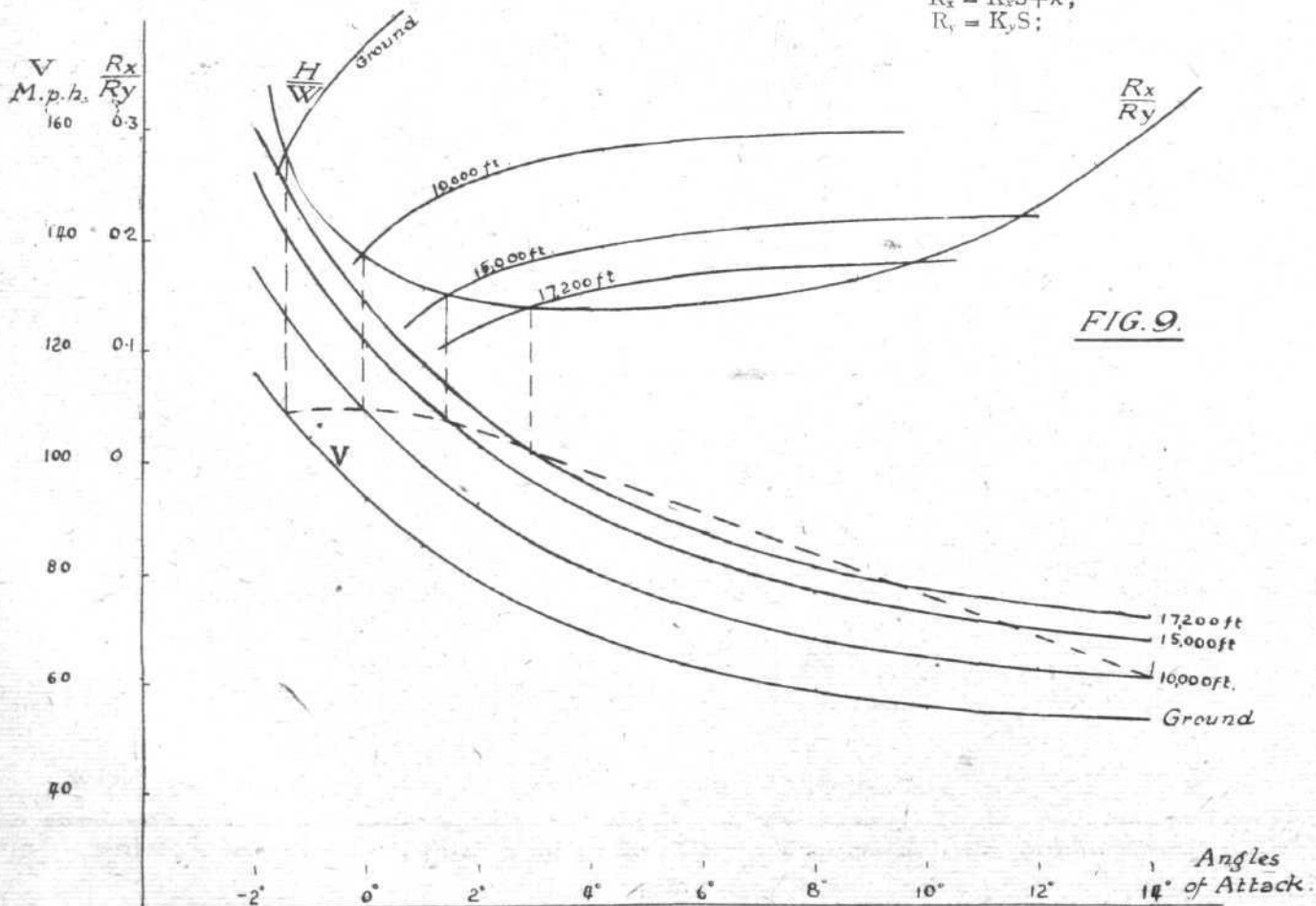


FIG. 9.

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and we have then at the altitude Z for the thrust of the propeller per unit weight

$$(1B) \frac{H}{W} = \frac{\alpha \mu n^2 D^4}{W}$$

for the resistance of the aeroplane per unit weight

$$\frac{R_x}{R_y} = \frac{K_x + \frac{\lambda}{S}}{K_y}$$

for the speeds

$$V = \sqrt{\frac{W}{\mu R_y}}$$

and lastly, for horizontal flight at the altitude Z ,

$$(10B) \frac{H}{W} = \frac{R_x}{R_y}$$

Construct the curves (Fig. 9):—

$$\frac{H}{W} = \phi_1(i),$$

$$\frac{R_x}{R_y} = \phi_2(i),$$

$$V = \sqrt{\frac{W}{\mu R_y}} \text{ for } \mu = 1.$$

If V_0 and V are the speeds and $\left(\frac{H}{W}\right)_0$ and $\frac{H}{W}$ the thrusts per unit weight corresponding to the same angle of attack for zero altitude and the altitude Z , we have from the above equations

$$(12B) V^2 = V_0^2 \frac{1}{\mu}$$

$$(13B) \frac{H}{W} = \mu \left(\frac{H}{W}\right)_0$$

The relations (12B) and (13B) enable us, knowing $\frac{H}{W} = \phi_1(i)$ and $\frac{R_x}{R_y} = \phi_2(i)$, to construct a system of curves of $\frac{H}{W}$ and V for different particular values of μ .

The diagram (Fig. 9) gives us the slow and rapid speeds V_1 and V_2 of horizontal flight at zero altitude and the similar speeds at different altitudes.

If the function μ instead of representing the ratio of the densities of the air represents a ratio of weights $\frac{W_1}{W_2}$, W_1 being the initial weight, it will be seen that when W_2 increases while W_1 remains constant, the equilibrium of the aeroplane will be under the same conditions of speed and incidence as when the altitude increases. The speed V_1 decreases. There exists in the limit a weight W for which the aeroplane climbs no longer.

If the function μ represents a ratio of surfaces $\frac{S_2}{S_1}$, S_1 being the initial surface, when S_2 decreases everything happens in the same way as when the altitude increases. The speed V_1 decreases. There exists in the limit a surface area S for which the aeroplane climbs no longer.

If, lastly, T decreases everything happens in the same way as when W_2 increases or when S_2 decreases.

Adding on weight to a given aeroplane then provides the same conditions of equilibrium as cutting down its surface.

Decreasing the power of the engine amounts to increasing the weight of the aeroplane.

(To be concluded.)

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, June 30th.
"Hostile activity in the air on the 29th inst. was not very great, but our fighting machines succeeded in destroying nine German aeroplanes and in driving down eight others out of control. Five of our machines are missing. Much important reconnaissance work was carried out by us, and a number of aerial photographs were taken. Aeroplane and balloon observation was afforded to our artillery throughout the day as usual. 15½ tons of bombs were dropped by our machines during the day, the most important targets being the railways at Lille, Courtrai, Comines, and Estaires. At night there was bombing on both sides. The enemy did practically no damage, and lost a machine. We dropped 18 tons of bombs, of which 8 tons were launched upon the railway connections at Tournai. All our night-flying machines returned safely."

General Headquarters, July 1st.
"On June 30th we had a most successful day in the air. In fighting, 25 enemy machines were shot down and 10 others were driven down out of control. Two German balloons were destroyed in addition. Our airmen carried out a large number of reconnaissances over the lines both by day and by night, and many aerial photographs were taken. The number of hostile batteries destructively engaged by our artillery with aeroplane and balloon observation was greater than on any day during the past fortnight. 29½ tons of bombs were dropped by us by day and 17 tons on the following night. Of the latter, over 7 tons fell with good effect on the railway connections at Tournai."

"From the whole of these operations all our aeroplanes returned safely, with the exception of one scout and one night-bombing machine."

Air Ministry, July 1st.

"In addition to the attacks already reported on the night of June 29th-30th, the chemical works at Mannheim were also bombed. One of the machines reported as missing on the 30th ult. has now returned. On the night of June 30th-July 1st further attacks were made on the enemy aerodrome at Boulay (Bolchen), on railway works and stations at Thionville, Remilly, Landau, Zweibrücken, and Saarbrücken. The works at Mannheim were again attacked."

"On July 1st the railways and workshops at Karthaus, the station at Trèves, and the railway triangle at Metz-Sablon were bombed with good effect. One hostile machine was shot down. Two of our machines are missing."

Headquarters, R.A.F., Independent Force, France, July 2nd.

"During the night July 1st-2nd, enemy's aerodrome at Boulay was successfully attacked, bursts being observed on the aerodrome and hutments. The Oppau Works, Soda Fabrik, and railway line at Mannheim were bombed with good effect, as were also the railway works at Thionville. On July 2nd bombs were dropped on the railway station at Trèves. Our formation was attacked over their objective by 12 enemy machines, one of which was shot down. The railway sidings and sheds at Coblenz were bombed with good results. All our machines returned safely."

General Headquarters, July 2nd.

"On the 1st inst. our aeroplanes were very active, fine weather enabling much work to be done in co-operation with the artillery, as well as reconnaissance and photography. Twenty-five German machines and three German balloons were destroyed during the day, and 13 other hostile aeroplanes were driven down out of control. In addition, two large hostile night-flying machines landed behind our line, the occupants being taken prisoner. Eight of our machines are missing. Twenty-two tons of bombs were dropped during the day, and 13 tons during the night. All our night-flying machines returned safely."

General Headquarters, July 3rd.

"The weather on July 2nd was fine but hazy. Our machines carried out reconnaissance, artillery, and photographic work as usual, but there was less enemy activity. Thirteen German aeroplanes were destroyed and nine others were driven down out of control. One German balloon was shot down. Four of our machines are missing. Nineteen tons of bombs were dropped in the course of the day and the following night on enemy railways, dumps, and billets."

General Headquarters, July 4th.

"On July 3rd weather was cloudy and enemy activity was slight. Our machines carried out a number of reconnaissances, and observed, as usual, for the artillery. Six hostile machines were destroyed and four others driven down out of control. During the day and the following night we dropped 16

tons of bombs, the railway junctions at Lille and Courtrai being the principal targets. All our machines returned safely."

War Office, July 4th.

"Italian Front.—The Royal Air Force scored some direct hits on infantry columns marching up to the Lower Piave. They have destroyed three enemy machines since the last report, with no loss to ourselves. Very low clouds for last four days."

General Headquarters, July 5th.

"Our aeroplanes co-operated in the successful attack of July 4th south of the Somme, both by heavily bombing the German positions throughout the previous night, and by machine-gun fire and bombing from a low altitude on enemy troops and transport during the actual operation. On other parts of the front reconnaissances and artillery co-operation were carried out. Eleven German machines were destroyed, and 10 were driven down out of control. One hostile balloon was shot down in flames. Four of our machines engaged in the battle area are missing. All machines on other parts of the front returned safely. Thirty-three and a half tons of bombs were dropped during the day of the 4th inst. and night of July 4th-5th."

Headquarters, R.A.F., Independent Force, July 5th.

"On the morning of July 5th, our machines heavily attacked the railway station at Coblenz. Observation was difficult owing to clouds. Saarbrücken was also successfully attacked. Our formation was attacked over Saarbrücken by hostile aeroplanes, one of which was brought down in flames and another was driven down. All our machines returned safely."

Admiralty, July 6th.

"The usual anti-submarine, hostile aircraft, and escort patrols have been maintained. One enemy seaplane was destroyed and three indecisive combats took place. About 15½ tons of bombs were dropped, a big fire being started at Bruges, also at Varsenaire aerodrome, north and south of Fort Lanin. Bursts were observed among the sheds, hangars, and warehouses, and on Maria Aelter aerodrome. At Zeebrugge bursts were observed around the lock gates and near two submarines. Four hits were registered on an enemy destroyer off Bassin d'Echouage, and on sheds and warehouses on the quay at Ostend."

War Office, July 6th.

"Palestine.—Activity during the past fortnight has in general been confined to the operations of the Air Services. On June 25th Amman Station, camps, and aerodromes were successfully attacked by the Royal Air Force. On June 27th bombs were dropped on camps, troops and transport in the Rujm-el-Asir with good effect."

General Headquarters, July 6th.

"There was little fighting in the air on July 5th. Two German machines were destroyed, and one was driven down out of control. One of our machines is missing. Our aeroplanes and balloons carried out a large amount of successful artillery work. Nineteen tons of bombs were dropped on selected targets during the day and the following night."

General Headquarters, July 7th.

"Our balloons and observation machines carried out much valuable work on the 6th inst. There were few combats in the air. Three German aeroplanes were destroyed and one was driven down out of control. One of our machine is missing. Seventeen tons of bombs have been dropped on various targets during the last 24 hours."

Headquarters, R.A.F., Independent Force, July 7th.

"On the afternoon of July 6th our squadrons successfully attacked the railways at Metz-Sablon. Two and a half tons of bombs were dropped on this objective. Our formations were attacked over the objective by enemy machines, one of which was driven down. All our machines returned safely. During the night July 6th-7th our machines successfully attacked the railway station and sidings at Saarbrücken, and the railways at Metz-Sablon."

Headquarters, R.A.F., Independent Force, July 8th.

"On the 7th inst. the station and factories at Kaiserslautern were attacked. Hostile machines were engaged over the objectives, and one of them was shot down. Two of our machines are missing. On July 8th the railway station, workshops, and sidings at Luxemburg were bombed by our squadrons. Bursts were observed in the station and also in the workshops."

General Headquarters, July 8th.

"Hazy weather interfered with work in the air on July 7th, and observation

was difficult. Seven enemy aeroplanes were destroyed during the day and four driven down out of control. Three of our machines are missing. We dropped 16 tons of bombs during the day and the following night, the principal targets attacked being Ostend docks and the railways at Tournai and Courtrai."

Headquarters, R.A.F., Independent Force, July 9th.

"On the 8th inst. our machines successfully bombed an enemy aerodrome, bombs being observed to burst on the sheds and hangars. During the night 8th-9th the enemy's aerodromes were again attacked with good results, two hangars being reported as having been set on fire. Trains and searchlights were attacked from a low altitude. All our machines returned safely."

Admiralty, July 9th.

"During the period July 4th-7th bomb raids have been made with good results. Ostend docks, Zeebrugge, Bruges docks, and hostile billets were attacked, and about six tons of bombs dropped. At Ostend bursts were observed in the harbour entrance, powder factory, warehouses, and sheds, alongside Bassin de Chasse, also in the vicinity of hostile batteries. At Bruges direct hits were obtained on a submarine shelter, railway, and merchant ships. The usual patrols have been carried out, and four enemy torpedo boat destroyers and four torpedo-boats near Zeebrugge were attacked with bombs. Enemy aircraft have been fairly active. One of our bombing formations were attacked by 16 hostile machines, three enemy machines being destroyed and three others driven out of control. All our machines returned safely. Three of our large seaplanes on anti-submarine patrol were attacked by seven hostile machines. During the engagement, which lasted 55 minutes, two enemy machines were destroyed. Although damaged, our machines returned safely."

"A British submarine patrolling off the East Coast of England was attacked on the afternoon of July 6th by five enemy seaplanes with bombs and machine-gun fire. It is much regretted that an officer and five men were killed. The submarine herself suffered only very slight damage, and was towed back into harbour by another submarine."

General Headquarters, July 9th.

"In spite of low clouds in the morning of July 8th and thunderstorms later in the day, our aeroplanes accomplished a good deal of photographic, observation, and reconnaissance work during the intervals of fine weather. Enemy activity in the air was slight. Seven German machines were destroyed and six driven down out of control. Four of our machines are missing. Nineteen tons of bombs were dropped principally on railway connections at Roulers, Tournai, and Wavrin [north-east of La Bassée], and on dumps at Warneton and Bac St. Maur. Practically no flying was possible at night."

War Office, July 9th.

"Salonica.—On the night of July 1st-2nd an attempted enemy raid near Doldzeli (south-west of Lake Doiran) was repulsed. On June 28th a hostile aeroplane crashed near Furka (west of Lake Doiran). On June 29th our machines bombed Hudova aerodrome (Vardar Valley). Bombs were observed to burst among the hangars. On July 7th an enemy aeroplane was brought down near Glimenli (north-east of Lake Doiran). During the month of June our aeroplanes shot down eight hostile machines, and drove down five others out of control. We lost only one machine."

General Headquarters, July 10th.

"Work in the air was interrupted on July 9th by showers of rain and low clouds, but photography and reconnaissances were carried out by us as usual and many hostile batteries were engaged with aeroplane observation. Enemy aircraft were active on the northern part of our front, and a number of combats took place, in which nine German machines were destroyed and one was driven down out of control. In addition, a hostile scout was brought down by anti-aircraft fire. In the course of the day we dropped 14 tons of bombs on selected targets over the line, two tons falling with good effect on Lille Junction and one and a half tons on Bruges docks. Three of our machines are missing. During the following night three tons of bombs were dropped on enemy railways and camps without loss to us."

Headquarters, R.A.F., Independent Force, July 11th.

"This morning, one of our squadrons bombed the railway sidings at Offenbourg. Some good bursts were observed. All our machines returned safely."

General Headquarters, July 11th.

"On July 10th seven enemy machines were destroyed by us and six others were driven down out of control. Four of our machines are missing. Heavy showers interrupted progress of aerial observation and photography, but, nevertheless, a good deal of this work was accomplished whenever the sky cleared, and, in addition, to tons of bombs were dropped by us during the day on different targets. Rain prevented flying at night."

Headquarters, R.A.F., Independent Force, July 12th.

"During the night of 11th-12th inst. our machines successfully bombed three enemy aerodromes, at two of which fires broke out. Many rounds were fired from machine-guns at trains, searchlights, and other military objects. On the 12th inst. the railway sidings at Saarburg were attacked. All our machines returned safely."

General Headquarters, July 12th.

"On July 11th heavy rain storms limited activity in the air on both sides, but our machines carried out reconnaissance work and observation for the fire of our guns whenever brighter intervals permitted. Nine tons of bombs were dropped on railway junctions behind the German lines. Three hostile machines were destroyed during the day and two driven down out of control. Three of our machines were missing. Night flying was impossible."

French.

Paris, June 30th.

"On June 28th and 29th our chasing aeroplanes brought down 15 German machines, and set fire to two captive balloons. In addition, 19 other enemy machines were put out of action. Our bombardiers during the same period carried out day and night raids, during which 47 tons of bombs were successfully dropped on the aviation grounds on the Somme, the bivouacs in the Rozieres-Braye region, in the valley of the Avre, and the railway stations of Soissons, Fere-en-Tardenois, &c. On June 28th 5 tons of explosives were dropped on the German troops, who were preparing to counter-attack in the Cutry region. Lieut. Fonck brought down three German aeroplanes on June 25th, and two others on June 27th. This brings to 49 the number of machines destroyed up to date by this pilot, and officially recorded."

Paris, July 1st.

"During the day of June 30th, 21 German aeroplanes were shot down or driven out of control. In addition, six captive balloons were set on fire by our crews."

"The following night our bombing planes dropped 22 tons of projectiles on the aviation grounds of Picardy, the railway station of Roye, and the dumps of Villers-Carbonnel, where a violent explosion was observed."

Paris, July 4th.

"During the month of June 29th enemy machines were brought down by our anti-aircraft defences, including three at night. In addition, 13 machines were damaged by our fire and compelled to abandon their mission."

Paris, July 5th.

"Our anti-aircraft guns brought down two enemy aeroplanes."

Paris, July 6th.

"Between July 1st and July 6th our crews brought down or drove down out of control 16 German aeroplanes and set fire to seven captive balloons. In addition, two enemy machines were shot down by anti-aircraft fire. During the same period our bombing machines dropped 56 tons of explosives on the

railway stations, cantonments, and aviation grounds in the enemy zone. A fire was observed in the railway stations of Chauines and Amagneluquy, and violent explosions, followed by fires, in the dumps of Neuville and Roye."

Paris, July 8th.

"On Saturday and Sunday 14 aeroplanes were brought down or put out of action, and two captive balloons were set on fire by our pilots. Our bombing machines dropped 28 tons of projectiles in the course of their raids by night in the regions of Fismes, Hirson, Fere-en-Tardenois, Amagne, Lucquy, &c. Latest reports show that Lieut. Ips brought down on May 31st, June 10th and 13th, his 10th, 11th, and 12th machines. Up to date this pilot has accounted for seven aeroplanes and five balloons. Adjudant Marinovitch brought down on June 1st and 15th and July 1st his 10th, 11th, and 12th aeroplanes. Adjudant Montron brought down on June 7th and 17th his 10th and 11th machines—nine aeroplanes and two balloons. Second Lieutenant Boyeau brought down on July 1st his 20th machine, and on July 5th his 21st and 22nd machines. His total is 14 balloons and eight aeroplanes officially reported. Two pilots who were reported missing in June had accounted for, respectively, Adjudant Quette 10 aeroplanes and Sergeant Bayless 12 aeroplanes."

Paris, July 10th.

"During July 8th seven German aeroplanes were brought down and two captive balloons set on fire by our pilots."

"Balkans.—The Allied airmen fought several actions in the air, during which two enemy machines were brought down."

Paris, July 11th.

"During the month of June our Air Service brought down 150 enemy machines and seriously damaged 181. In addition, 31 captive balloons were brought down in flames. Our bombarding Air Service dropped more than 600 tons of bombs."

"Balkans.—British airmen successfully bombed a number of enemy depôts in the Struma Valley."

U.S.A.

Paris, July 1st.

"Yesterday one of our airmen shot down a hostile machine in the Toul region."

Paris, July 3rd.

"American aviation squadrons co-operated with our troops in the action north-west of Chateau-Thierry. Three of our airmen did not return."

Paris, July 11th.

"As the result of a bombing expedition last evening five of our machines are missing."

Paris, July 12th.

"Yesterday, our airmen shot down a hostile machine in the region of Thiaucourt."

Italian.

Rome, June 30th.

"In the Lagarina and Sugana Valleys enemy railway establishments were bombed by our airmen."

Rome, July 2nd.

"Yesterday morning five English aeroplanes bombed the enemy base at Cattaro. A ton of bombs was dropped. A ship near the submarine base was set on fire and one bomb fell in the middle of the submarine quarter. All the English machines returned to their base."

Rome, July 4th.

"During the last two days our bombardment flights—together with Allied planes—dropped about 18,000 kilos [18 tons] of bombs on important centres and crossroads of the enemy on the Lower Piave. Troops and transport were attacked with machine-gun fire at a low altitude. An airship effectively bombarded the railway junction of the Sugana Valley to the south of Trento."

Rome, July 5th.

"During the last days to hostile aeroplanes and two captive balloons were brought down in air fighting."

Rome, July 6th.

"Our aviation was very active bombarding enemy troops and centres beyond the Lower Piave. Two enemy aeroplanes were brought down."

"Altogether since June 15th up to to-day the following was captured from the enemy: . . . two aeroplanes . . ."

Rome, July 7th.

"Our own and Allied aeroplanes and those of the Italian Royal Navy participated with their usual daring."

Rome, July 8th.

"Our own and Allied aeroplanes and airships of the Italian army and navy were, during the day yesterday and last night, intensely and effectively active. Eight enemy machines were brought down in air fighting."

Rome, July 9th.

"Albania.—Our own and British aeroplanes lent their precious aid during the fighting. The number of prisoners has risen to more than 1,300. The capture of guns, aeroplanes, and machine-guns, in numbers not specified, and a large quantity of booty is reported."

German.

Berlin, June 30th.

"Lieut. Udet gained his 36th and Lieut. Loewenhardt his 31st aerial victory. Lieut. Jakobs has shot down during the last few days his 20th, 21st and 22nd opponents."

Berlin, July 1st.

"Lieut. Loewenhardt achieved his 32nd aerial victory."

Berlin, July 2nd.

"Lieut. Udet obtained his 37th and 38th aerial victories, and Lieut. Kroll his 28th and 29th."

Berlin, July 3rd.

"Four aeroplanes have been shot down from an American squadron of nine units. Lieut. Udet thereby obtained his 39th aerial victory, and Lieut. Loewenhardt his 33rd and 34th. Lieut. Friedrich and Sergeant Thom shot down their 20th opponents."

Berlin, July 4th.

"Lieut. Udet obtained his 40th aerial victory and Lieut. Rumey his 29th and 30th."

Berlin, July 5th.

"Lieut. Meckoff obtained his 35th aerial victory and Lieut. Thuy his 25th."

Berlin, July 6th.

"Lieut. Rolle achieved his 20th aerial victory."

Berlin, July 7th.

"Lieut. Kroll obtained his 30th aerial victory and Lieut. Konnecke his 21st."

Berlin, July 8th.

"Lieut. Billik achieved his 22nd aerial victory."

"Two squadrons of seaplanes of the Marine Corps under the command of First Lieut. of the Reserve Christiansen and Lieut. of the Reserve Becht severely damaged the British U-boats C 35 (?) and E. 51 by bomb hits and machine-gun fire on the afternoon of July 6th off the mouth of the Thames. Enemy destroyers endeavoured to tow in both submarines. C. 35 (?) was last observed in a sinking condition."

Berlin, July 9th.

"Eighteen enemy aeroplanes were shot down yesterday. Lieut. Billike obtained his 23rd and 24th aerial victories, and Lieut. Friedrich his 21st."

Austrian.

Vienna, July 3rd.

"It has been since ascertained that it was First Lieut. Birwig who, with Squadron-Leader Kauer as pilot, shot down the well-known Italian chasing airman, Major Baracca, on June 19th."

A PROPELLER SHAPER.

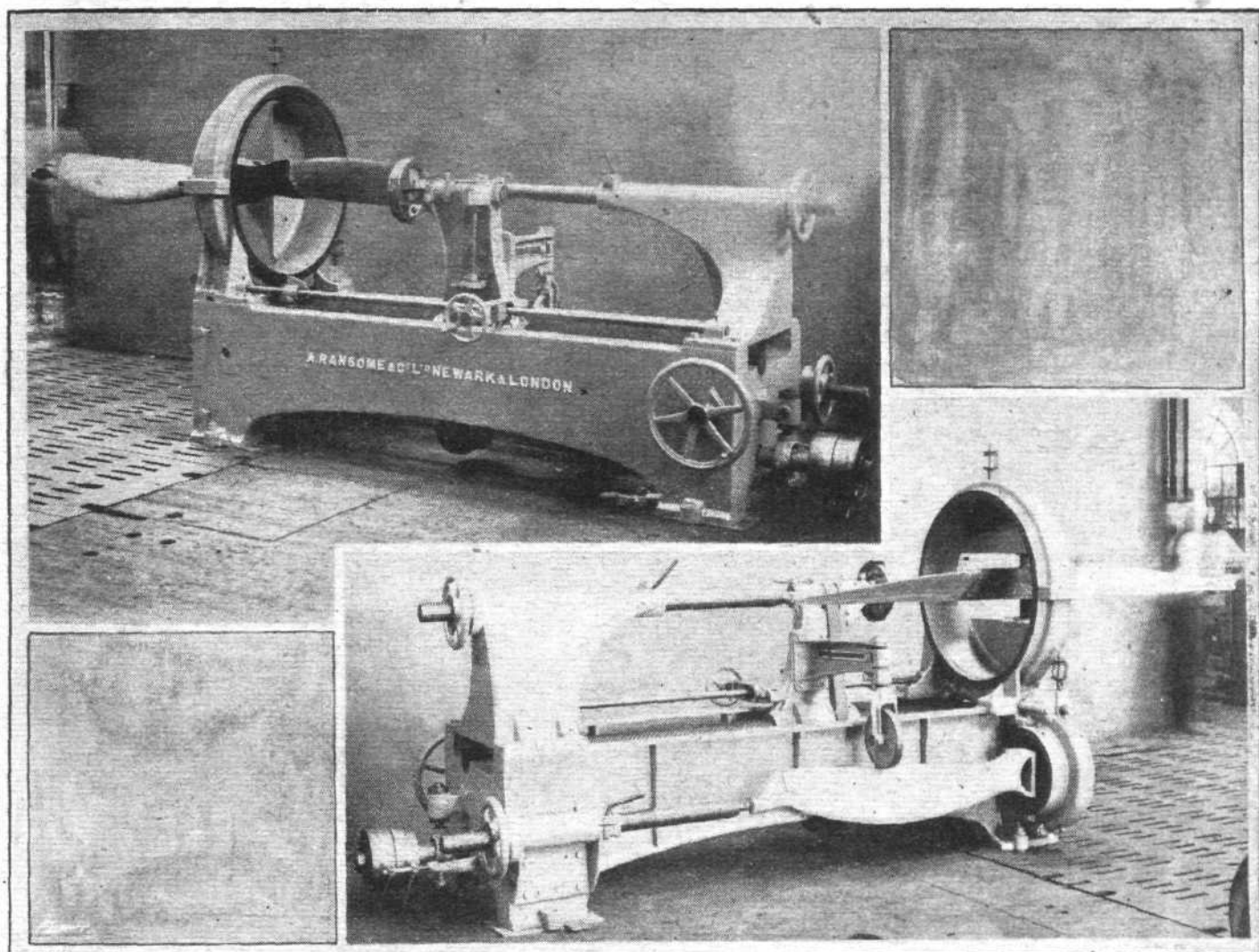
QUITE a deal of interest has been aroused by the demonstration recently given by Messrs. A. Ransome and Co., Ltd., Newark-on-Trent, of the propeller shaper which they are introducing.

Of solid and compact design, the machine is self-contained, and driven by one belt; it is claimed that its manipulation is so simple that any unskilled person of average intelligence can operate it after a few minutes' instruction. Four-bladed propellers can be shaped with the same facility as two-bladers, as the blades of a four-blader swing clear outside the driving band.

The main bed of cast-iron box section, carries all the parts

blade, the machine started up a foot lever, the rocker is brought to its work by a simple release mechanism and, the split nut being closed, the operation is started. The action now becomes purely automatic, no further attention is necessary, as, when the cutter reaches the propeller boss, the feed is automatically cut off. The machine can then be stopped, the blade taken out and the operation repeated.

As it may be necessary sometimes to have a little more left on the blade above its finished dimensions, arrangement for this is provided on the rocker bracket. A quadrant with holes drilled in and a lever with a spring plunger to



THE EXCELSIOR PROPELLER-SHAPING MACHINE.—Front and back views.

of the machine that the rocking bracket carrying the cutter block and the tracer roller oscillating and sliding along a screw mounted at each end of the box. This bracket is rocked backward and forward, its movement being controlled by the contour of the model, while it slides forward on its fixed feed screw by the rotation of a split nut. This split nut is rotated by gearing from the cutter spindle, an arrangement designed to prevent any accident to the propeller by the cutter belt coming off, as feed motion is derived from the cutter spindle.

The propeller is held by placing the thin end of the blade (with its prepared centre) in the specially designed centre of the tailstock and then passing a bolt through the propeller boss. The rocker bracket is placed at the thin end of the

suit these holes is so designed that by placing the plunger in any of these holes variation of $\frac{1}{8}$ mm. in the thickness is obtained from the finished dimension. The cutters are of a special design for this particular class of work and give a good and clean cut; the only work necessary after machining being the air of a sand belt.

In order to obtain the best results with the cutters, a "jointing" apparatus has been designed to attach to the cutter spindle rocking bracket. The process of "jointing" consists in truing-up the cutters so that each cutter does exactly the same amount of work. The cutters having been fixed, the cutter block is run at full speed, and a small piece of carborundum is traversed across the cutters, and by just touching their edge, equalises them.



THE AIRCRAFT WORKERS' STRIKE.

THE strike of aircraft workers in the London district was settled on the evening of July 10th, and work was resumed the next morning. Mr. Winston Churchill, Minister of Munitions, with Sir Thomas Munro, Chief Adviser, Labour Regulation Department, and Sir David Shackleton, Permanent Secretary, Ministry of Labour, held a series of conferences

with members of the London District Aircraft Committee, and after negotiations lasting six hours the representatives of the workers agreed to recommend that the strikers should return to work on the understanding that the Government took over the Alliance Aeroplane Works of Messrs. Waring and Gillow, and that the shop steward Rock was re-employed

pending the result of the inquiry by the Government into the merits of his dismissal. We refer to the matter editorially on p. 789. The following is a summary of the announcement made by the Minister of Munitions to the workmen's representatives:—

"The Minister of Munitions has during the last two days conferred personally with all the parties concerned in the dispute at the Alliance Aeroplane Company's works. He has come to the conclusion that neither side is wholly free from blame. The strikers have committed an illegality in leaving their work. They have also thrown over their regularly constituted trade union leaders. On the other hand, the Minister cannot feel that the management has been instructed or sympathetic. Neither side have shown themselves in the course of the dispute sufficiently alive to the grave responsibilities imposed upon workmen and employers alike by the present situation of the war. Both sides have indeed intimated their willingness to accept arbitration and to be bound by its results; but it is impossible to arbitrate on a matter that is at the moment the subject of a strike. The workmen, however, declined to resume work unless Mr. Rock (the chairman of the Shop Committee) is re-instated pending the results of the arbitration. Mr. Rock himself, and the trade union authorities concerned, tendered to the Minister an undertaking that, if he were reinstated temporarily, he and his comrades would strictly conform to all the rules of the establishment during the process of arbitration and would be loyally bound by its findings. The firm, however, were unable to entertain this proposal. The deadlock was complete, and the area of the dispute was continually being widened throughout the country.

"It is believed by the workmen generally that the firm in question has opposed the legitimate development of the shop steward and shop committee movement. The Minister, without pronouncing a final opinion, has formed the view that this belief is not wholly unfounded. Certainly it would have been preferable, having regard to the representative position of Mr. Rock, to have proceeded against him by a prosecution under the Munitions of War Acts rather than by summary dismissal. It would be intolerable that at a moment like this an industry so vital to the safety of the country should be thrown into confusion by a conflict of this kind. The Minister, therefore, has felt it his duty to invoke his legal powers as far as they may be necessary, under the Defence of the Realm Act and the Munitions of War Acts. In consequence he has directed that the establishment in question be taken over forthwith by the Government. It may take a few days for the Minister to assume effective control. Priority of employment in this factory under the new control will be accorded to all previously engaged there, provided they immediately apply for such employment. An inquiry will be held into the circumstances of the discharge of Mr. Rock from his late firm, and should such inquiry show him to be to blame his dismissal will follow. Meanwhile the strikers at this establishment are reminded that as soon as the firm against whom they have struck has been taken over by the Government, they are no longer strikers, but merely unemployed or idle workmen. It is accordingly the duty of these men and all others on strike in sympathy to resume work immediately. Failing such resumption, the Minister will use his powers against them under the Defence of the Realm Act and the Munitions of War Acts."

A settlement was arrived at on this basis, and was accepted by the men's representatives in the following terms:—

"That we, the National Woodworkers' Aircraft Committee, London District Aircraft Committee, and other representatives of the workers (both metal and wood), hereby pledge the whole of the men and women now on dispute loyally to abide by the decision of the proposed inquiry if Mr. Rock be allowed to start work as soon as the Ministry of Munitions has assumed the effective control of the factory, and that if Rock be acquitted, he shall receive compensation from the date of his dismissal from the Alliance Aeroplane Company. Further, we hereby recommend an immediate resumption of work at all shops now on dispute."

The following letter has been sent to Mr. Lloyd George and the Minister of Munitions by the London Master Builders and Aircraft Industries' Association with reference to the recent strike of aircraft workers:—

"July 11th, 1918.

"Sir,—As a number of the members of my association are affected by the London Aircraft strike, I am instructed to place on record this association's view of the very unsatisfactory way in which the Ministry of Munitions has dealt with this matter. There can be no other opinion formed in reading the Press notice than that the Ministry of Munitions

has in effect censured the firm struck against, whereas the true record is that the firm only endeavoured to maintain proper order and procedure in its establishment, which was met with defiance by the man Rock, who has not had the support of the recognised trade unions.

"My association is most astonished at such an attitude, having regard to the opinions expressed by the deputation who attended before Mr. Wolfe and Sir Thomas Munro and others on Monday last, when several of my members were present.

"My association is also surprised to find Labour being consulted to the exclusion of the employers' association, considering the questions were such as to involve the whole industry.—I am, Sir, your obedient servant,

"S. B. DEPREE (Secretary)."

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